United States Department of Agriculture

Johnson Bar Fire Salvage Project

Draft Supplemental Environmental Impact Statement

Forest Service	Nez Perce-Clearwater National Forests	Moose Creek Ranger District

Dec 2017

Johnson Bar Fire Salvage Project
Draft
Supplemental Environmental Impact Statement
Idaho County, Idaho

Lead Agency:	**USDA Forest Service, Nez Perce-Clearwater National Forest**
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Abstract: A draft supplemental environmental impact statement (SEIS) has been prepared for the Johnson Bar Fire Salvage Project to analyze alternatives for implementation of salvage harvest and associated road activities. Project activities are proposed on National Forest System lands on the Nez Perce-Clearwater National Forest, Moose Creek Ranger District in Idaho County, Idaho. Three action alternatives have been developed based on public input and collaborative efforts. **Alternative 1** is the "no action" alternative. **Alternative 2**, the proposed action, includes 2,348 acres of salvage harvest and associated road activities, **Alternative 3** is a modification of the proposed action to reduce ground disturbance, was developed to respond to comments regarding potential sedimentation in the Selway and Middle Fork Clearwater Rivers. This alternative includes salvage harvest of 1,988 acres and associated road activities. **Alternative 4** is a modification of the proposed action, developed to respond to comments regarding harvesting within or seen from the Wild and Scenic River Corridor, and landings along U.S. Highway 12 and the Selway River Road, plus economic feasibility. This alternative includes salvage harvest of 1,349 acres and associated road activities.

It is important that reviewers provide their comments at such times and in such a way that they are useful to the agency's preparation of the final SEIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns and contentions. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial reviews.

Send Comments to:	**Nez Perce-Clearwater National Forest Supervisor's Office c/o Sara Daugherty 903 3rd Street Kamiah, ID 83536**

Summary

The Nez Perce-Clearwater National Forests are preparing this draft Supplemental Environmental Impact Statement (SEIS) in response to a complaint that was filed on March 11, 2016 against the February 2016 Johnson Bar Salvage Record of Decision (ROD) and a Preliminary Injunction that was granted by the United States District Court for the State of Idaho on May 12, 2016. This draft SEIS will provide additional analysis in response to the Preliminary Injunction.

This draft SEIS incorporates by reference and supplements the original Johnson Bar Final Environmental Impact Statement (FEIS) of January 2016. The proposed project activities would include salvage harvest of dead and dying fire killed timber and road decommissioning within the Johnson Bar Fire Salvage project area while protecting and enhancing the Outstanding Remarkable Values (ORVs) for the Middle Fork Clearwater and Selway Wild and Scenic Rivers by project design, reducing fuel loadings, recovering economic value, trending tree species composition towards more resilient species, and reducing road related effects to aquatic species and the watersheds. This SEIS provides supplemental information for all resource areas in response to management within the Middle Fork Wild and Scenic River Corridor and the Corridor's Outstanding Remarkable Values and cumulative effects of harvest on nearby State of Idaho and Privates lands, impacts of the 2015 fires in the area, reduction of treatment acres due to timber deterioration, and the closure of two local sawmills.

The approximately 26,788-acre project area is located south, southeast, and southwest of Lowell, Idaho within the Middle Fork Clearwater River and Lower Selway Watersheds in Idaho County, Idaho, and include the Swiftwater, Elk City, Goddard, and O'Hara Creeks. The segments of the Middle Fork Clearwater Wild and Scenic River System within this area is classified as a "recreation" segment of the river corridor. The components of this river system within the project area are the Middle Fork Clearwater River and the Selway River. There are no Wilderness Areas, Idaho Roadless Areas, or Research Natural Areas within the project area. The former Middle Fork Face roadless area, as designated by the 1987 Nez Perce National Forest Plan (Forest Plan), is within the project area; however, the 2008 Idaho Roadless Rule, which was a publically vetted and analyzed process, removed the Middle Fork Face as a recognized roadless area.

Purpose and Need for Action

The purpose and need for the Johnson Bar Fire Salvage project was developed by comparing the management objectives found in the Wild and Scenic Rivers Act in the Middle Fork of the Clearwater Comprehensive River Management Plan (CRMP), and desired conditions in the Nez Perce Forest Plan to the existing conditions in the project area related to Outstanding Remarkable Values (ORVs) of the Middle Fork Clearwater and Selway Wild and Scenic Rivers. Where plan information was not explicit, best available science and local research were utilized, including collaboration with the Clearwater Basin Collaborative group and Idaho Rivers United.

The overall purpose of this project is to salvage harvest fire impacted timber while protecting and enhancing the Middle Fork Clearwater River and Selway River Outstanding Remarkable Values through project design. The salvage harvest of fire-killed trees would contribute to protecting and enhancing ORVs by removing excessive fuel loadings to reduce potential soil damage by future wildfires, reducing restrictions to big game access and reducing sediment sources in order to maintain a viable and attractive Forest environment. Tree salvage would also support the economic structure of local communities, provide for regional and national needs, and reduce road-related sediment input through road reconstruction and road decommissioning. The project would maintain terrestrial habitat structure, function, and diversity through snag, riparian and old growth retention; improve overall watershed conditions by promoting reforestation and reducing soil erosion; restore early seral species on the landscape for long term resiliency; and provide improved forage access for big game species.

The following resource management opportunities were identified for the project area based upon existing conditions; the applicable Forest Plan management direction; recommendations in the Selway and Middle Fork Clearwater Rivers Subbasin Assessment (USDA Forest Service 2001); the Management Guidelines for the Middle Fork of the Clearwater Wild and Scenic River System; and the needs, opportunities, and issues identified by an interdisciplinary team, field reviews, and public input.

Public Involvement

A Notice of Intent (NOI) advertising the scoping period was originally published in the *Federal Register* on October 16, 2014. A corrected NOI was published on October 24, 2014 updating the scoping period from the originally published 30 days to the corrected 45 days. The proposed project has been presented to the Nez Perce Tribe at quarterly staff-to-staff meetings since November 2014. The Draft Environmental Impact Statement (DEIS) was advertised for a 45-day public comment period in April 2015. Seventeen commenters provided comments during the 45-day DEIS comment period. A legal notice advertising the start of a 45-day objection period was published in the *Lewiston Morning Tribune* on October 9, 2015. Three objections were accepted by the Region 1 Regional Forester. An Objectors Meeting, which was open to the public, was held between Region 1, the Nez Perce-Clearwater National Forests, and the objectors on January 4, 2016. As instructed by the Regional Forester, the Forest updated the Record of Decision (ROD) and FEIS analysis. The updated FEIS was posted on the Forest website in January 2016. The Johnson Bar ROD was signed on February 17, 2016. In March 2016 a complaint requesting a Preliminary Injunction was filed with the United States District Court for the District of Idaho and a decision was issued in May 2016. An agreement was reached between the parties and a Motion to Dismiss was granted in July 2016. At that time the ROD and accompanying project specific consultations were withdrawn as part of the agreement. An NOI was published in the *Federal Register* on September 16, 2016 advising the public that a SEIS was being prepared by the Forest Service to supplement the original FEIS analysis in response to the Preliminary Injunction.

The original four alternatives, No Action Alternative (Alternative 1), Proposed Action (Alternative 2), Reduced Ground Disturbance (Alternative 3), and No Wild and Scenic River Corridor Harvesting (Alternative 4), are being carried through the SEIS analysis; however, only the remaining viable acres within those alternatives are analyzed in detail.

Alternatives Considered in Detail

After considering the potential effects of the alternatives, the Responsible Official will select an action or mix of actions to improve ecological conditions in the project area and best meet the social values associated with the area. If the No Action alternative is selected, the Responsible Official will decide what design criteria, management requirements, and monitoring would be needed for its implementation.

Alternative 1 (no action)

The No Action alternative provides a baseline for comparison of the environmental consequences as a result of potential implementation of the other alternatives. Under the No Action alternative, no project activities would be implemented.

The No Action alternative was analyzed in detail for all resources in the FEIS and remains applicable. This SEIS incorporates that analysis by reference; therefore, only changed circumstances resulting in additional effects as a result of the No Action alternative will be carried forward in this analysis.

Actions Common to all Action Alternatives

The following actions would be included as a component of all of the action alternatives:

- Harvest activities would include 51 miles of road maintenance/reconditioning, which includes removal of brush, clearing of culvert inlets, grading of roads for water flow control, and the removal of closure barriers as needed; along with 5.6 miles of road reconstruction involving spot culvert replacements.
- Decommissioning of 21.2 miles of non-system and system roads;
- Long-term storage of 4.7 miles of system roads;
- Use existing helicopter service landings (3 for Alternatives 2 and 3, and 2 for Alternative 4);
- Salvage harvest would consist of variable retention, with 20-85% of the trees being removed;
- Project Design Criteria; and
- Monitoring.

Alternative 2 – Proposed Action

Alternative 2 was developed in response to the purpose and need for action. It was presented to the public during the scoping process. Alternative 2 originally proposed harvesting 3,096 acres in the FEIS. As a result of additional degradation of the timber the remaining viable acres have been reduced to 2,348 acres, which are being analyzed in this SEIS. From the remaining viable acres, harvest activities would consist of 105 acres tractor logging, 915 acres skyline logging, and 1,328 acres helicopter logging. Activities would also include 5.6 miles of system road reconstruction, to include culvert replacement, spot surfacing, stabilization of Road #470, installation of cross-drainage on Road #9723B, installation of culverts on Road #653A, and opening of stored Road #470B. Any additional haul roads being utilized as part of the proposed project would consist of County and State highways. The Proposed Action would utilize 3.4 miles of new and existing temporary roads, 4.4 miles of new and existing swing trails, and 6 new and 11 existing helicopter landings.

Alternative 3 – Reduced Ground Disturbance

Alternative 3 was developed in response to comments received during the Scoping process regarding potential sedimentation to the Selway and Middle Fork Rivers. The original Alternative 3 in the FEIS proposed harvesting 2,710 acres; however, as a result of continued deterioration of the timber the remaining viable acres have decreased to 1,988 acres, which are being analyzed in this SEIS. Of the remaining acres, harvest activities would consist of 23 acres tractor logging, 432 acres skyline logging, and 1,533 acres helicopter logging. Activities would also include 5.6 miles of system road reconstruction, to include culvert replacement, spot surfacing, stabilization of Road #470, installation of cross-drainage on Road #9723B, and installation of culverts on Road #653A. Any additional haul roads being utilized as part of the proposed project would consist of County and State highways. Alternative 3 would utilize approximately 0.2 mile of existing temporary roads, approximately 0.3 mile of new swing trails, and 3 new and 11 existing helicopter landings.

Alternative 4 – No Wild and Scenic River Corridor Harvesting (Preferred Alternative)

Alternative 4 was developed in response to internal and external comments received during the Scoping process regarding harvesting within the Wild and Scenic River Corridor, potential visual impacts from harvest along the Corridor, impacts of helicopter landings along Highway 12 and the Selway River Road, and economic feasibility. As a result of continued deterioration of the timber, acreage for Alternative 4 has decreased from the original 2,207 acres analyzed in the FEIS to 1,349 acres, which are being analyzed in this SEIS. Of the remaining acres, harvest activities would consist of 108 acres tractor logging, 772 acres skyline logging, and 469 acres helicopter logging. Activities would also include 5.6 miles of system road reconstruction, to include culvert replacement, spot surfacing, stabilization of Road #470, installation of cross-drainage on Road #9723B, installation of culverts on Road #653A, and opening of stored Road #470B. Any additional haul roads being utilized as part of the proposed project would consist of County and State highways. Alternative 4 would utilize approximately 3.2 miles of new and existing temporary roads, 4.4 miles of new and existing swing trails, and 3 new and 6 existing helicopter landings, all of which are outside of the Wild and Scenic River corridor.

Document Organization

The Forest Service prepared this draft SEIS in compliance with NEPA and other relevant Federal and State laws and regulations. This SEIS discloses the direct, indirect, and cumulative effects that would result from the Proposed Action and action alternatives for recreation, hydrology, fisheries, soils, vegetation, visuals, wild and scenic rivers, wildlife and economics. For the remaining resources, this SEIS incorporates the original FEIS analyses by reference. The document is organized into 4 chapters and 9 appendices.

Additional documentation, including more detailed analyses of project area resources, are located in the project planning record located at Nez Perce-Clearwater National Forests, 903 3rd Street, Kamiah, Idaho 83536.

This SEIS includes information necessary for the Forest Supervisor to make a decision based on the environmental effects of the Proposed Action or the Alternatives. Federal regulations specify the types of information necessary for decision-makers to make good decisions. In so doing, this document is organized as follows:

- Chapter One states the purpose and need for action. The purpose and need is the basis upon which to evaluate any alternatives to the Proposed Action.
- Chapter Two describes the alternatives in detail and summarizes the differences between the alternatives.
- Chapter Three describes the baseline (existing) conditions for each resource area that may be affected by the Alternatives and analyzes the potential environmental effects (direct, indirect, and cumulative) as a result of implementing the proposed alternatives.
- Chapter Four lists those involved in the preparation and review of the EIS, including the IDT and other technical support.

Other sections include references cited, a glossary, an index, acronyms, and appendices containing supporting technical information.

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Chapter 1. Purpose and Need for Action

This chapter discusses current and desired conditions, purpose and need for action, the Proposed Action, management direction, scope of the analysis, and availability of project files.

1.1 Introduction

The Nez Perce-Clearwater National Forests are proposing project activities, to include the salvage harvest of dead and dying trees and road decommissioning, within the proposed Johnson Bar Fire Salvage project area in order to protect and enhance Wild and Scenic Outstanding Remarkable values (ORVs), trend tree species composition towards more resilient species, reduce road related effects to aquatic species and the watersheds, and to recover economic value.

1.1.1 Project Area

The approximately 26,788-acre project area is located south and west of Lowell, Idaho within the Middle Fork Clearwater River and Lower Selway Watersheds in Idaho County, Idaho, and would include the Swiftwater, Elk City, Goddard, and O'Hara Creeks. The river corridor within this area is classified as a "recreation" segment of the Middle Fork Clearwater (which includes the Middle Fork Clearwater and Selway River) Wild and Scenic River System.

The proposed project is located in portions of Township (T.) 32 North (N.) Range (R.) 7 East (E.), T.32N., R.6E., T.31N., R.7E., and T.31N., R.6E., Boise Principle Meridian. Access is via Forest Roads #470 (Swiftwater), #9723 (Hotpoint), #1121 (Goddard Point), #9701 (Peterson Point), and #653 (O'Hara).

There are no Wilderness Areas, Idaho Roadless Areas, or Research Natural Areas within the project area. The former Middle Fork Face roadless area, as designated by the 1987 Nez Perce National Forest Plan (Forest Plan), is within the project area; however, the 2008 Idaho Roadless Rule, which was a publically vetted and analyzed process, removed the Middle Fork Face as an Idaho Roadless Area.

1.1.2 Fire Occurrence, History, and Risks

Forests in the western United States are unhealthy due to high fuel build ups caused by root rot and bark beetle mortality (Western Governors' Association Forest Health Advisory Committee, 2008) (USDA Forest Service, 2004). Interactions of natural disturbance cycles, such as fires, wind events, insects, and disease can have cascading interactions leading to reduction in the number of old trees and shade tolerant species with thin bark. Natural successional processes, along with agents of change, have followed a natural trajectory. Trees grow and become dense and overstocked. Root rot has weakened trees allowing them to become susceptible to Douglas-fir tussock moth, Douglas-fir bark beetles, and mountain pine beetles. The tussock moth tends to attack trees with the most foliage, whereas, the Douglas-fir beetles and mountain pine beetles tend to attack larger, less vigorous trees [(Weatherby and Their) as cited in Kegley 2004] (USDA, 2004). Root rot, insects, and wind- blown trees have resulted in large volumes of fuel (Tappeiner *et al*., 2007). In some cases, insect infestations may have contributed to large fires (USDA Forest Service 1998a). Recently, increased fuels have led to increased fire intensity (Jenkins, Runyon, Fettig, Page and Bentz, 2014).

Historically fires were the primary disturbance factor that shaped the composition and structure of the forests in the project area (Figure 1). In the period ranging from 1970 through 2013, there were 180 reported fires within the project area (Figure 1). Only three were larger than an acre.

The project area is characterized as a mixed severity fire regime (Smith, 1997), which is consistent with the pattern of the Johnson Bar fire (Figure 1). Since the late 1880s, the total landscape acreage burned is approximately 15,100 acres, or about 52% of the project area. Counting areas that have reburned at least once the total overall acres are approximately 18,800. Prior to 2014, the largest fire was in 1889 (9,043 acres), which the Johnson Bar fire perimeter overlays. With the exception of the 1910-1919 reburns, generally the trend in the area appears to be that the reburn potential begins around 20 years after the first fire. This time allows for enough smaller surface fuels and ladder fuels in the form of regeneration to accumulate to actively carry the next fire and become established in the heavier fuels that are amassing as snags fall. Up to 90% of the surface fuels are in the greater than 3-inch category.

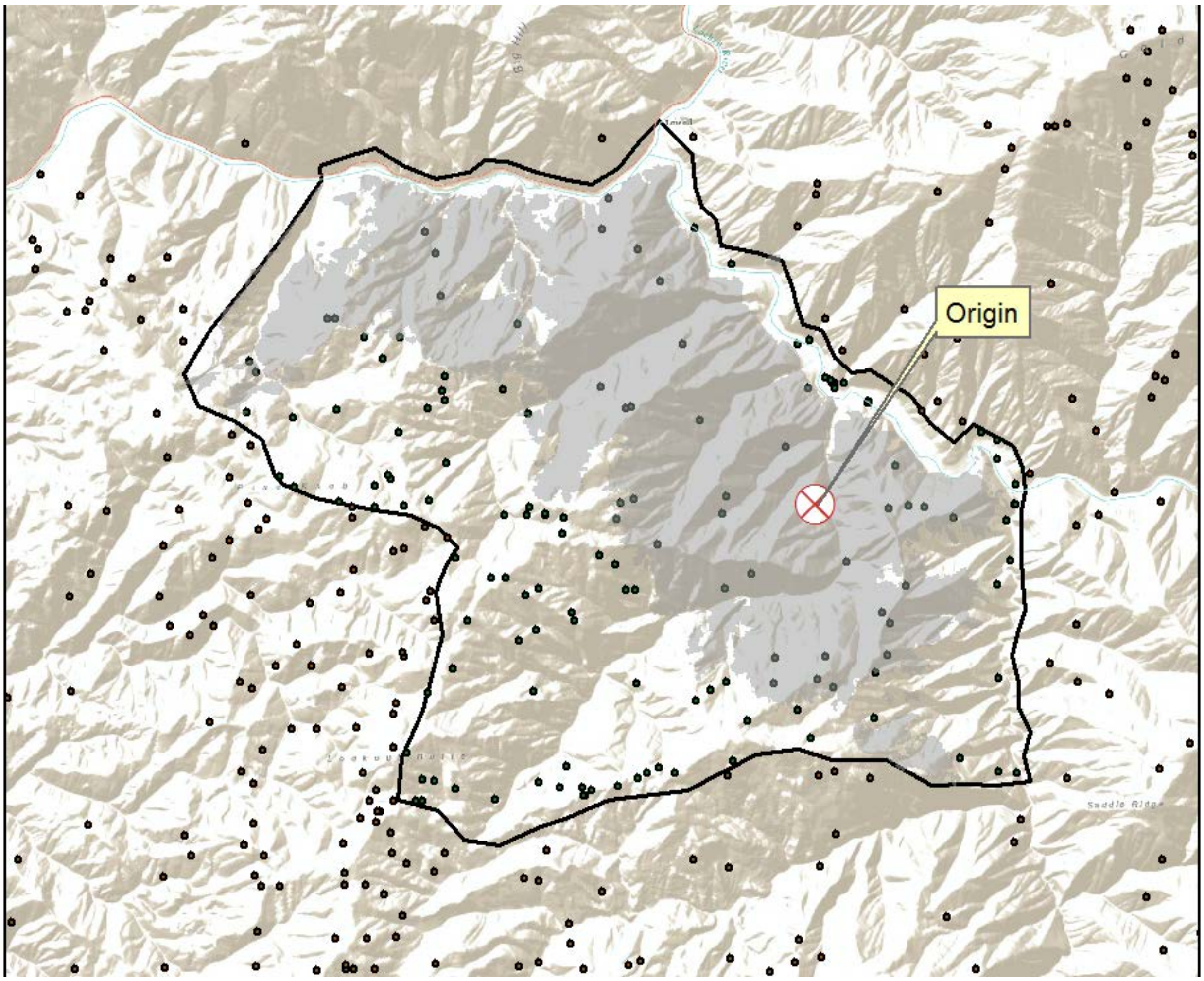

Figure 1. The project area and surrounding lands with reported fires (180) from 1970-2013. The shaded area denotes the Johnson Bar fire area and the 'X" denotes the fire origin

Insect and disease mortality in the project area contributed highly to the extreme fire behavior exhibited by the Johnson Bar fire when it burned through these areas. Other factors hampering suppression efforts were lack of quick access and inability to quickly construct firelines due to high large diameter surface fuel loadings and an excessive amount of burnt out hazard trees.

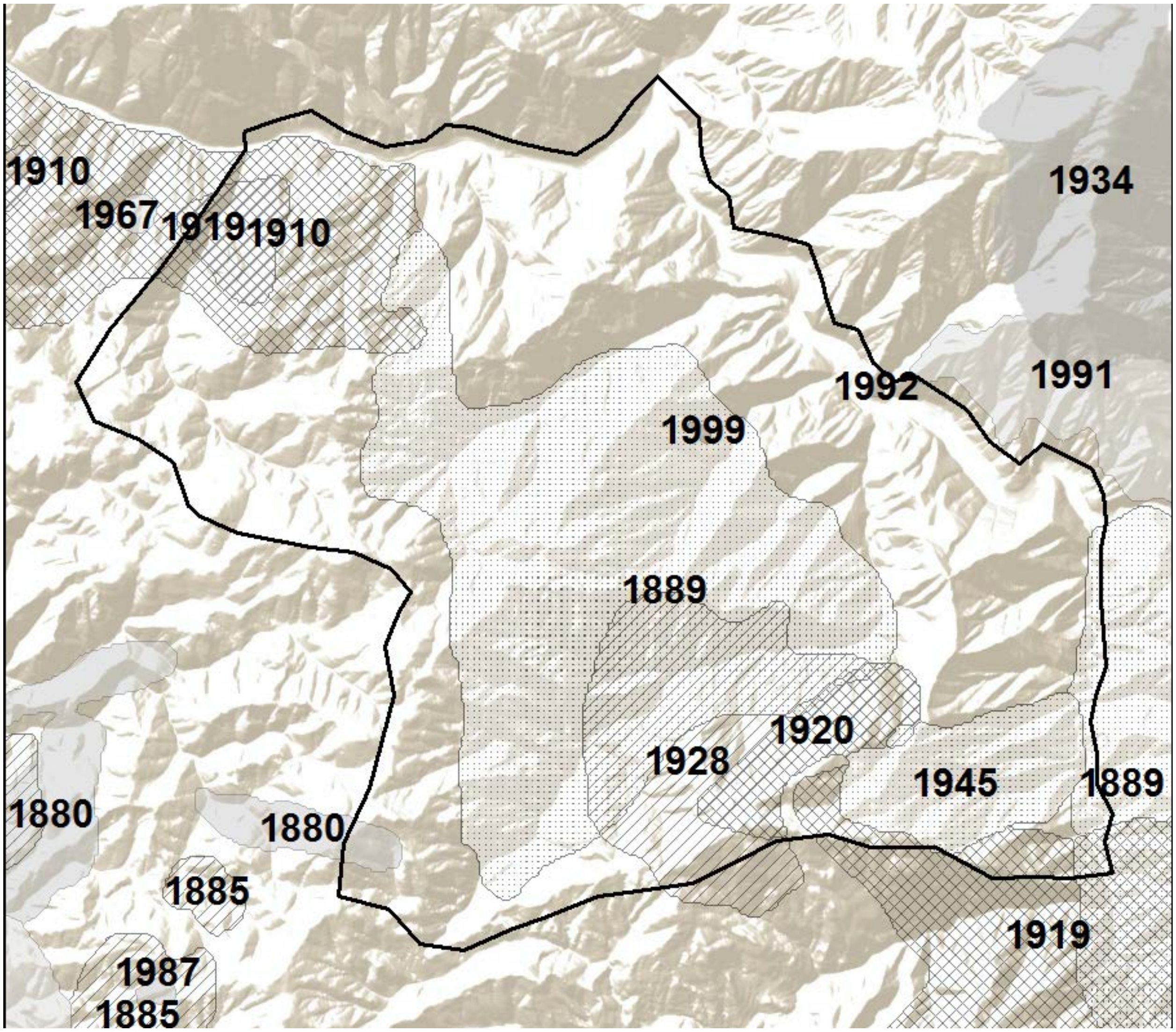

Figure 2. Fire history since late 1880s. Only former Nez Perce National Forest data, does not include former Clearwater National Forest data to the north

Generally, lightning storms track across the area from southwest to northeast. Using a point density grid, which shows the relative amount of fire starts per area, it is apparent that the project lies at the northeast end of a distinct historical storm track, the highest density on the Nez Perce-Clearwater National Forests. It is reasonable to assume that this area will continue to have a high fire frequency. If a warming trend in global climate occurs, studies suggest that lightning activity may increase over the western United States, which could amplify ignitions in the local area (Summers, 2011) (Romps, 2014).

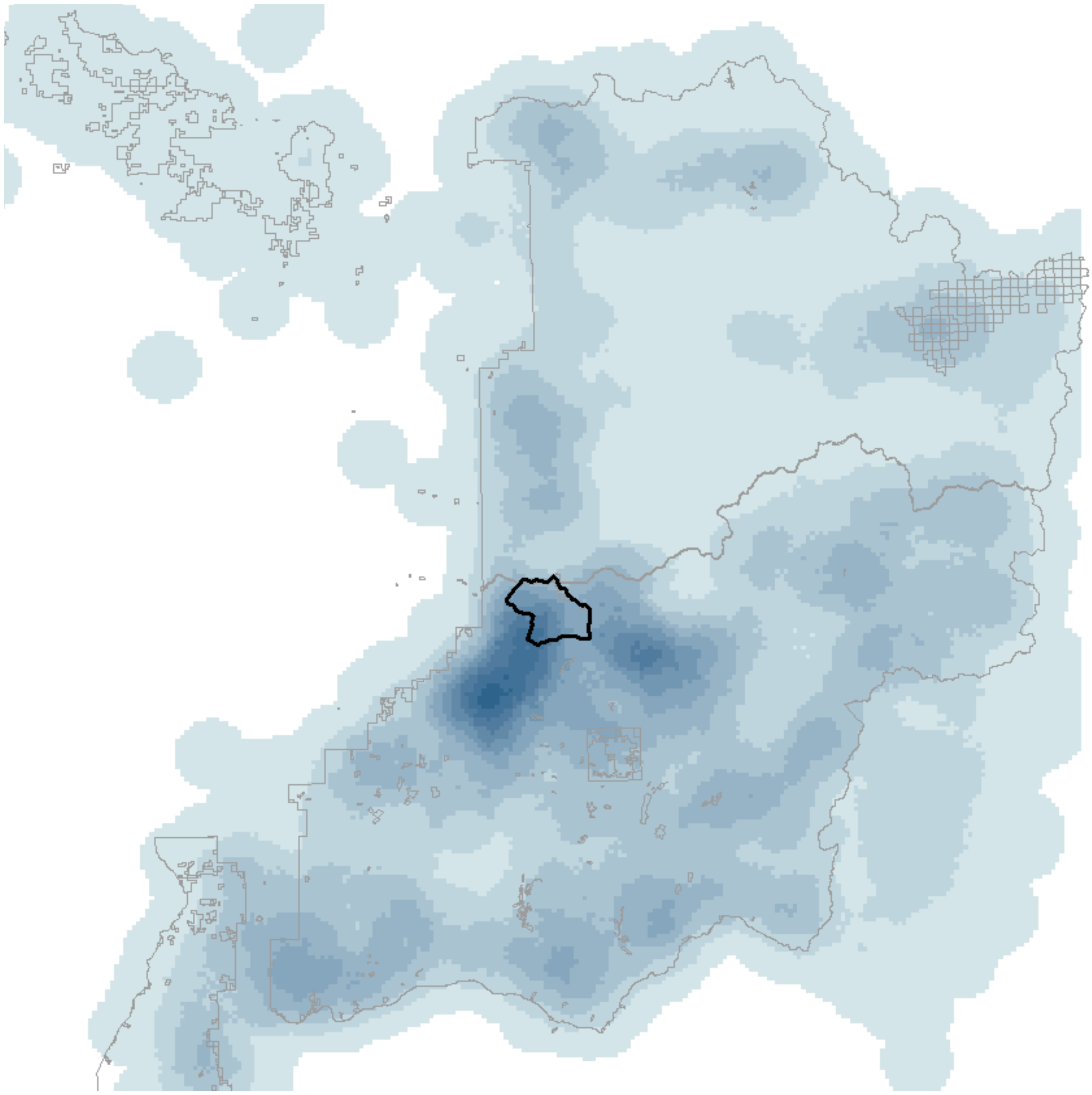

Figure 3. Fire density of the Nez Perce-Clearwater National Forest with project area in center. Darker colors denote higher fire frequency

1.2 Background

On August 3, 2014 the Johnson Bar wildfire started as a result of lightning and escaped initial attack. The fire burned over 13,300 acres in the Middle Fork Clearwater River and Lower Selway Watersheds, more specifically along Swiftwater, Elk City, Goddard, Lodge, Decker, and O'Hara creeks. The majority of the acres affected by the fire burned on National Forest System administered lands (12,910 acres), with 34 acres on State of Idaho Lands, and 76 acres on private lands.

Initial attack fire crews attempted to contain the fire for a number of days; however, due to the extreme fuel loadings, a product of increasing insect and disease mortality, fire intensity, and an excessive amount of burnt out hazard trees firefighters were forced to back away from directly fighting the fire and instead attempt an indirect approach. A Type 2 Incident Management Team was brought in to manage the fire on August 9, 2014 and began indirect line construction;

however, due to a lack of control options, dense forests, and extreme fuel loadings, coupled with several wind events, the fire was able to spread rapidly and uncontrollably. Fire suppression continued into October and cost approximately $13,500,000.

The fire resulted in widespread tree mortality, particularly within the mixed conifer/western red cedar/grand fir stands. Prior to the fire, the Forests were actively analyzing forest and watershed restoration projects under the Collaborative Forest Landscape Restoration Program (CFLRP) within the Tinker, Lodge, Decker, Swiftwater, Elk City and O'Hara Creek drainages.

The CFLRP, which was established by Congress under Title IV of the Omnibus Public Land Management Act of 2009, has a number of program goals including encouraging the collaborative, science-based ecosystem restoration of priority forest landscapes.

The CFLRP established a fund to be used for restoration work on priority landscapes. The Clearwater Basin Collaborative (CBC), in partnership with the Nez Perce-Clearwater National Forests, developed and submitted a comprehensive restoration proposal, the Selway–Middle Fork Clearwater project, in 2010 (CBC and Forest Service 2010). The Selway–Middle Fork Clearwater project was selected for funding by the Secretary of Agriculture in August 2010.

Projects that the Forests were analyzing or planned to develop in the fire affected area were generally proposing to utilize commercial timber harvest to restore natural fire regimes, create a balance of age classes across the landscape, restore more resilient tree species, and reduce fuel loads to prevent large uncontrollable wildfires. Merchantable timber generated would meet local and regional needs, as well as produce funds for the Forests to invest in future restoration work.

As a result of the Johnson Bar fire, the EIS for the Middle Fork Vegetation Management Project, scoped in January 2014, was cancelled. The O'Hara-Goddard Project, which was in development, was revised to focus on the fire impacted areas.

Desired conditions for the Johnson Bar Fire Salvage project area were developed using the Forest Plan (USDA Forest Service 1987a) direction, including the Middle Fork Comprehensive River Management Plan; broad-scale assessments [e.g., Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (USDA Forest Service 1997) and the Selway and Middle Fork Clearwater Rivers Subbasin Assessment (USDA Forest Service 2001)]; and the best science currently available.

The scoping process was started in October 2014 for the Johnson Bar Fire Salvage Project during which time field trips and interdisciplinary team (IDT) meetings were conducted, which continued throughout project development and analyses. A Notice of Intent (NOI) advertising the scoping period was originally published in the Federal Register on October 16, 2014. A corrected NOI was published on October 24, 2014 updating the scoping period from the originally published 30 days to the corrected 45 days. The proposed project has been presented to the Nez Perce Tribe at quarterly staff-to-staff meetings since November 2014.

The Draft Environmental Impact Statement (DEIS) was advertised for a 45-day public comment period in April 2015. Seventeen commenters provided comments during the 45-day DEIS comment period. A legal notice advertising the 45-day objection period was published in the Lewiston Tribune on October 9, 2015. Three objections were accepted by the Region 1 Regional Forester. An Objectors Meeting, which was open to the public, was held between Region 1, the Nez Perce-Clearwater National Forests, and the objectors on January 4, 2016. As instructed by the Regional Forester, the Forest updated the Record of Decision (ROD) and FEIS analysis. The updated FEIS was posted on the Forests website in January 2016.

The Johnson Bar ROD was signed on February 17, 2016. In March 2016 a complaint requesting a Preliminary Injunction was filed with the United States District Court for the District of Idaho and a decision was issued in May 2016 supporting a preliminary injunction. An agreement was reached between the parties and a Motion to Dismiss was granted in July 2016. At that time the ROD and accompanying project specific consultations were withdrawn as part of the agreement. An NOI was published in the Federal Register on September 16, 2016 advising the public that a SEIS was being prepared by the Forest Service to supplement the original FEIS analysis in response to the Preliminary Injunction. Additional field trips, data collection, and IDT meetings were also conducted in response to the need for additional information and analyses. This SEIS provides supplemental information for all resource areas in Chapter 3 in response to management within the Middle Fork Clearwater Wild and Scenic River Corridor and its Outstanding Remarkable Values; and well as the cumulative effects of harvest on nearby State of Idaho and Privates lands, impacts of the 2015 fires in the area, reduction of treatment acres due to timber deterioration, and the closure of two local sawmills.

1.3 Purpose and Need

The purpose and need for the Johnson Bar Fire Salvage project was developed by comparing the management objectives found in the Wild and Scenic Rivers Act in the Middle Fork of the Clearwater Comprehensive River Management Plan (CRMP), and desired conditions in the Nez Perce Forest Plan to the existing conditions in the project area related to Outstanding Remarkable Values (ORVs) of the Middle Fork Clearwater and Selway Wild and Scenic Rivers. Where plan information was not explicit, best available science and local research were utilized, including collaboration with the Clearwater Basin Collaborative group and Idaho Rivers United.

The overall purpose of this project is to salvage harvest fire impacted timber while protecting and enhancing the Middle Fork Clearwater River and Selway River Outstanding Remarkable Values through project design. The salvage harvest of fire-killed trees would contribute to protecting and enhancing ORVs by removing excessive fuel loadings to reduce potential soil damage by future wildfires, reducing restrictions to big game access and reducing sediment sources in order to maintain a viable and attractive Forest environment. Tree salvage would also support the economic structure of local communities, provide for regional and national needs, and reduce road-related sediment input through road reconstruction and road decommissioning. The project would maintain terrestrial habitat structure, function, and diversity through snag, riparian and old growth retention; improve overall watershed conditions by promoting reforestation and reducing soil erosion; restore early seral species on the landscape for long term resiliency; and provide improved forage access for big game species.

The following resource management opportunities were identified for the project area based upon existing conditions; the applicable Forest Plan management direction; recommendations in the Selway and Middle Fork Clearwater Rivers Subbasin Assessment (USDA Forest Service 2001); and the needs, opportunities, and issues identified by an interdisciplinary team, field reviews, and public input.

1.3.1 Protect and Enhance Wild and Scenic River ORVs

Existing Condition: Approximately 1,300 acres of the Johnson bar fire burned within the designated Wild and Scenic River corridor. The fire burned almost the entire length of the portions of the Middle Fork Clearwater and Selway Rivers within the project area. Fire effects of concern for the Wild and Scenic River corridor include burned and downed trees readily visible along the river-edge and throughout the river corridor and potential for increased erosion due to loss of organic matter. The existing condition of the individual Outstandingly Remarkable Values is contained within the resource analyses in Chapter 3 for those specific resources.

Desired Future Condition: The desired future condition is to protect and enhance the following ORVs of the Middle Fork Clearwater and Selway Wild and Scenic Rivers: Scenery, Recreation, Fish, Water Quality, Wildlife, Vegetation/Botany, Historic, and Cultural recommendations in the Selway and Middle Fork Clearwater Rivers Subbasin Assessment (USDA Forest Service 2002).

Need for Action: There is a need to protect and enhance the scenic, scientific, aesthetic, and recreational values of the Middle Fork Clearwater and Selway Wild and Scenic Rivers without limiting other such uses that do not interfere with public use and enjoyment of these values. Removal of fire damaged trees in some areas would reduce the future fire susceptibility and reburn potential. Reburns tend to impact soils and removed the duff layer which can lead to hillslope erosion and subsequent impacts to fish and water quality. Dead tree removal would provide better big game access to forage within the fire area. Access decreases as dead trees fall and create movement barriers. Reforestation of burnt areas would provide for quicker tree cover which reduces erosion and provides for improved visual quality and wildlife habitat over the long term.

1.3.2 Goods and Services

Existing Condition: The Johnson Bar fire burned over 13,000 acres resulting in widespread and ongoing tree mortality. Much of the mortality occurred and is continuing to occur in Management Areas allocated as being suitable for timber production.

Desired Future Condition: The desired condition is to provide a sustained yield of resource outputs as directed by the Nez Perce National Forest Plan, which contains measures to Protect and enhance the Outstandingly Remarkable Values of the Wild and Scenic Rivers.

Need for Action: Fire killed trees lose economic value quickly. There is a need to harvest the trees while they still have an economic value in order to utilize their value to pay for fire recovery activities such as reforestation, erosion control road work, and fuel treatments and to provide materials for local industries and job support.

1.3.3 Fisheries and Watershed Restoration

Existing Condition: Gravel and native surface roads could contribute sediment to stream channels through surface erosion, ditchline flow into streams, and through road failures. This can negatively affect water quality and fish habitat. Within and adjacent to the fire perimeter are roads that are no longer needed for future management. Most of these roads are either closed year-round to motorized use, or are non-system roads (leftover from past management and not considered part of the current transportation system). There are opportunities to decommission or store some of these roads in the project area. There are also opportunities to reduce road-related sediment from roads that are needed for future management.

Desired Future Condition: Maintain road systems that are stable, minimizing hydrologic connectivity to nearby streams and adverse effects to aquatic habitat, while protecting and enhancing the WSR corridors remarkable water quality.

Need for Action: There is a need to improve watershed function and reduce road-related sediment delivery to streams, which could impact fish and water quality, by removing unneeded roads, and storing or improving roads needed for future management.

1.4 Management Direction

1.4.1 Nez Perce Forest Plan

Although the Clearwater and Nez Perce National Forests were administratively combined in February 2013, management of the lands formerly within the boundary of the Nez Perce National Forest will continue to be guided by direction found in the Nez Perce National Forest Plan until the plan is revised. The Forest Plan (USDA Forest Service 1987a) includes goals, objectives, standards, and guidelines that direct management of forest resources. Forest-wide direction is applicable throughout the Forest, and management area direction ties specific goals, objectives, and standards to the unique capabilities of given parcels of land. Forest Plan management areas within the project area are listed in Table 1.

Table 1. Nez Perce Forest Plan management areas within the project area

Management Area	Description of Management Area	Acres Management Area in Project Area
01	Public Safety	25
8.2	Wild and Scenic River	2,308
10	Water	942
12	Timber	10,508
14	Timber/Big Game Visuals	8
16	Elk	9,929
17	Timber/Visuals	2,357
20	Old Growth	2,960
21	Moose	811

The Forest Plan standards apply to National Forest System (NFS) lands within the Nez Perce National Forest boundary. They are intended to supplement, not replace, National and Regional policies, standards, and guidelines found in Forest Service Manuals (FSM) and Handbooks.

The proposed project analysis was guided by the goals, objectives, standards, guidelines, and management area direction within the Nez Perce National Forest Plan, including direction in the Comprehensive River Management Plan. This Project would help move the Forest toward desired conditions as described in the Forest Plan and other relevant planning directives.

1.4.2 Laws and Regulations

The management of timber and aquatic resources on National Forest System lands is based on several federal laws and regulations that are described below.

1.4.2.1 Clean Air Act

The Clean Air Act, passed in 1963 and amended numerous times since then, is the primary legal authority governing air quality management. This Act provides the framework for national, state, and local efforts to protect air quality. The Montana/Idaho State Airshed Group was formed to coordinate all prescribed burning activities in order to minimize or prevent effects from smoke emissions and ensure compliance with the National Ambient Air Quality Standards (NAAQS) issued by the Environmental Protection Agency (EPA), the federal agency charged with enforcing the Clean Air Act. The USDA Forest Service, including the Moose Creek Ranger District, is a member of this Airshed Group. The project area is within the North Airshed Unit 13. All post-harvest site preparation and timber salvage would be conducted according to the requirements of the Montana/North Idaho Smoke Management Unit guidelines.

1.4.2.2 Clean Water Act

The Clean Water Act, as amended, stipulates that states are to adopt water quality standards. Included in these standards are provisions for identifying beneficial uses, establishing the status of beneficial uses, setting water quality criteria, and establishing Best Management Practices (BMPs) to control non-point sources of pollution. Executive Order 12088 also requires the Forest Service to meet the requirements of the Act.

Section 313 of the Clean Water Act, as amended, requires Federal agencies to comply with all Federal, State, interstate, and local requirements, administrative authority, and processes and sanctions with respect to control and abatement of water pollution.

Section 303(d) of the Clean Water Act, as amended, stipulates that states must identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). For waters identified on this list, states must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards.

Section 404 of the Clean Water Act, as amended, requires permits to dredge or fill within waters of the United States. The US Army Corps of Engineers administers these provisions.

1.4.2.3 State Water Quality Standards

Environmental Protection Agency regulations require each state to adopt an anti-degradation policy as one component of its water quality standards. The objective of the Idaho Anti-degradation Policy is, at a minimum, to maintain and protect existing instream water uses and the level of water quality necessary to protect those uses. Beneficial uses and water quality criteria and standards are identified in the State of Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02).

1.4.2.4 Region 1 Soil Quality Standards

Region 1 FSM Soil Supplement 2500-99-1 updates and clarifies the previous soil quality supplement (FSH 2509.18-94-1, Chapter 2) based on recent research and collective experience. The analysis standards address basic elements for the soil resource: (1) soil productivity (including soil loss, porosity; and organic matter), and (2) soil hydrologic function. Region 1 Soil Quality Standards (USDA Forest Service 2014) specify that at least 85% of an activity area, which is defined as a land area affected by a management activity, must have soil that is in satisfactory condition. These Regional Soil Quality Standards require that detrimental management effects (e.g., compaction, displacement, rutting, severe burning, surface erosion, and mass wasting) to the soil resource not exceed 15% of an activity area and that retention of coarse woody material be appropriate for the habitat type. In areas exceeding 15% detrimental soil conditions as a result of prior activities, the cumulative detrimental effects from project implementation, including restoration, should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality. Project design criteria were developed to better meet these soil quality standards.

1.4.2.5 The National Fire Plan and Healthy Forest Restoration Act

The National Fire Plan (NFP) was developed in August 2000 following a landmark wildfire season with the intent of actively responding to severe wildland fires and their effects to communities while ensuring sufficient firefighting capabilities. The NFP addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. With regard to jurisdiction, direction in the NFP allows for the Forest Service to take NFP action on NFS lands, and for States to take and coordinate action on State and private lands. The Healthy Forests Restoration Act of 2003 (HFRA) (P.L. 108-148) contains a variety of provisions to address hazardous fuel reduction and forest restoration projects on specific types of federal lands that are at risk of wildland fire and/or insect and disease epidemics. The HFRA helps all landowners and managers restore healthy forest and rangeland conditions on those lands, regardless of ownership.

Both the NFP and HFRA provide overarching direction to reduce the threat of wildfire and restore ecosystems. Management actions proposed within the project area are designed to be consistent with this direction. Particularly, proposed management activities would trend the general landscape condition toward desired fuel profiles and would optimize opportunities to treat hazardous fuels in identified Wildland-Urban Interface (WUI) lands and across the project area landscape.

1.4.2.6 Endangered Species Act

FSM 2670 directs the Forest Service to conserve endangered and threatened species and to utilize its authorities in furtherance of the Endangered Species Act (ESA), and to avoid actions that may cause a species to become threatened or endangered. FSM 2670 also requires the Forest Service to maintain viable populations of all native and desirable non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on NFS lands. As directed by the ESA, biological assessments and consultation under Section 7 of the ESA will be completed for this decision.

1.4.2.7 Executive Orders 11988 and 11990

These federal Executive Orders (EOs) provide for the protection and management of floodplains and wetlands. Numerous floodplains and wetlands exist within the analysis area.

EO11988 (Floodplain Management) requires federal agencies to evaluate the potential effects of actions it may take in a floodplain to avoid adversely affecting floodplains wherever possible, to ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management, including restoring and preserving such land areas as natural undeveloped floodplains, and to prescribe procedures to implement the policies and procedures of this EO.

EO 11990 (Protection of Wetlands) requires Federal agencies to take action to avoid adversely affecting wetlands wherever possible, to minimize wetlands destruction and preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this EO. The Johnson Bar Fire Salvage project activities have been designed to be consistent with the requirements of EO 11988 and EO 11990 through the retention of PACFISH buffers.

1.4.2.8 Executive Order 12898

EO 12898 (Environmental Justice) directs each federal agency to make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. An associated memorandum emphasizes the need to consider these types of effects during NEPA analysis. The Proposed Action and alternatives would not disproportionately adversely affect minority or low-income populations, including American Indian tribal members.

1.4.2.9 Executive Order 13112

EO 13112 (Invasive Species) was issued on February 3, 1999, to enhance federal coordination and response to the complex and accelerating problem of invasive species. EO 13112 directs federal agencies to work together [as stated in the Preamble] to "…prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health effects that invasive species cause." Project activities have been designed to be consistent with the requirements of EO 13112.

1.4.2.10 Idaho Forest Practices Act

The Idaho Forest Practices Act regulates forest practices on all land ownership in Idaho. Forest practices on National Forest System administered lands must adhere to the rules pertaining to water quality (IDAPA 20.02.01). The rules are also incorporated as BMPs in the Idaho Water Quality Standards. Project activities have been designed to be consistent with the Idaho Forest Practices Act.

1.4.2.11 Idaho Stream Channel Protection Act

The Idaho Stream Channel Protection Act regulates stream channel alterations between mean and high water marks on perennial streams in Idaho (IDAPA 37.03.07). Instream activities on NFS lands must adhere to the rules pertaining to the Act. The rules are also incorporated as BMPs in the Idaho Water Quality Standards. Project activities have been designed to be consistent with the Idaho Stream Channel Protection Act.

1.4.2.12 National Environmental Policy Act, Sections 101 and 106

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) was signed into law on January 1, 1970. NEPA establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within the federal agencies. NEPA also established the CEQ.

Title I of NEPA contains a Declaration of National Environmental Policy that requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony. Section 102 requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. Specifically, all federal agencies are to prepare detailed statements assessing the environmental effect of and alternatives to major federal actions significantly affecting the environment. These statements are commonly referred to as EISs.

The public has an important role in the NEPA process, particularly during scoping, to provide input on what issues should be addressed in an EIS and to comment on the findings in an agency's NEPA documents. The public can participate in the NEPA process by attending NEPA-related hearings or public meetings and by submitting comments directly to the lead agency. The lead agency must consider all comments received from the public and other parties on NEPA documents during the comment period.

1.4.2.13 National Forest Management Act

The National Forest Management Act (NFMA) (16 U.S.C. 1600–1614, August 1974, as amended 1976, 1978, 1980, 1981, 1983, 1985, and 1990) reorganized, expanded, and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on NFS lands. The NFMA requires the Secretary of Agriculture to assess forest lands; develop a management program based on multiple-use, sustained-yield principles; and implement a resource management plan for each unit of the NFS. It is the primary statute governing the administration of national forests. Project activities have been designed to be consistent with the NFMA.

1.4.2.14 National Historic Preservation Act

Section 101 of the National Environmental Policy Act requires federal agencies to preserve important historic, cultural, and natural aspects of our national heritage. The legal processes associated with the protection and preservation of these resources is outlined in the National Historic Preservation Act of 1966 (NHPA) (36 CFR 800) and subsequent amendments. Passed by Congress two years before NEPA, the NHPA sets forth a framework for determining if a project is an “undertaking” that has the potential to effect cultural resources. The implementing regulations also outline the processes for identifying, evaluating, assessing effects, and protecting such properties. The coordination or linkage between the Section 106 process of the NHPA and the mandate to preserve our national heritage under NEPA is well understood and is formally established in 36 CFR 800.3b and 800.8. The terminology of “…important historic, cultural, and natural aspects of our national heritage” found in NEPA includes those resources defined as “historic properties” under the NHPA [36 CFR 800.16(l)(1)]. It is thus the Section 106 process that agencies utilize to consider, manage, and protect historic properties during the planning and implementing stages of federal projects. The Forest meets its responsibilities under NHPA through compliance with the terms of a Programmatic Agreement (PA) signed between Region 1, the Idaho State Historic Preservation Office, and the Advisory Council on Historic Preservation.

1.4.2.15 National Wild and Scenic Rivers Act

Section 10(a) of the Wild and Scenic Rivers Act states:

Each component of the National Wild and Scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other such uses that do not interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting **aesthetic, scenic, historic, archaeologic, and scientific features**. Management Plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area. The Johnson Bar project protects and maintains the ORVs through selective treatment area placement and treatment design criteria as guided by the Forest Plan , which incorporates the Middle Fork Comprehensive River Plan (1969) and the Middle Fork Clearwater River Resource Assessment (2002).

1.4.2.16 Tribal Treaty Rights

American Indian tribes are afforded special rights under various federal statutes: NHPA; NFMA; Archaeological Resources Protection Act of 1979 (ARPA) (43 CFR Part 7); Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (43 CFR Part 10); Religious Freedom Restoration Act of 1993 (P.L. 103141); and the American Indian Religious Freedom Act of 1978 (AIRFA). Federal guidelines direct federal agencies to consult with tribal representatives who may have concerns about federal actions that may affect religious practices, other traditional cultural uses, or cultural resource sites and remains associated with tribal ancestors. Any tribe whose aboriginal territory occurs within a project area is afforded the opportunity to voice concerns for issues governed by NHPA, NAGPRA, or AIRFA.

Federal responsibilities to consult with tribes are included in the NFMA; Interior Secretarial Order 3175 of 1993; and EOs 12875, 13007, 12866, and 13084. EO 12875 (Enhancing the Intergovernmental Partnership) calls for regular consultation with tribal governments. EO 13007 (Indian Sacred Sites) requires consultation with tribes and religious representatives on the access, use, and protection of sacred sites. EO 12866 (Regulatory Planning and Review) requires that federal agencies seek views of tribal officials before imposing regulatory requirements that might affect them. EO 13084 (Consultation and Coordination with Indian Tribal Governments) provides direction regarding consultation and coordination with tribes relative to fee waivers. EO 12898 (Environmental Justice) directs federal agencies to focus on the human health and environmental conditions in minority and low-income communities, especially in instances where decisions may adversely affect these populations (see "Executive Order 12898" above). NEPA regulations (40 CFR 1500–1508) invite tribes to participate in forest management projects and activities that may affect them.

Portions of the Forest are located within ceded lands of the Nez Perce Tribe. Ceded lands are federal lands on which the federal government recognizes that a tribe has certain inherent rights conferred by treaty. In Article 3 of the Nez Perce Treaty of 1855, the United States of America and the Nez Perce Tribe mutually agreed that the Nez Perce retain the following rights:

> …taking fish at all usual and accustomed places in common with citizens of the Territory [of Idaho]; and of creating temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing horses and cattle…

The proposed Johnson Bar Fire Salvage project has been presented to the Nez Perce Tribe at the quarterly staff-to-staff meetings since November 2014.

1.5 Proposed Action

The Forest Service is proposing harvest and associated road activities to meet the purpose and need for action. A more detailed description of these activities can be found in Chapter 2, Appendix A – Maps, Appendix B – Unit Acres by Alternative, Appendix C – Salvage Operations and Tree Mortality Criteria, and Appendix D – Transportation Analysis.

The Forest Supervisor of the Nez Perce-Clearwater National Forest is the responsible official who will review the proposed action, the alternatives to the proposed action, public comments and the environmental consequences to make a decision. The decision would contain activities that best meet the purpose and need, desired future condition, and provide consistency with Nez Perce Forest Plan standards and guidelines for all related resource areas. The decision would include design criteria necessary for the activities to take place and provide resource protection. The Forest Supervisor will decide:

- Should restoration activities of burned areas, including salvage harvesting in the project area, be completed, and if so, which environmental considerations should be applied and at what cost?
- Should temporary roads be constructed, and if so, how many miles of roads should be constructed and where should they be constructed?

- Should any existing roads be decommissioned, and if so, how many miles and which ones?
- What design criteria, mitigation measures, and/or monitoring should be applied to the proposed project?

A portion of activities from one of the action alternatives may be selected; or a combination of activities from multiple action alternatives may be selected.

1.6 Public Involvement

A Notice of Intent (NOI) advertising the scoping period was originally published in the *Federal Register* on October 16, 2014. A corrected NOI was published in the *Federal Register* on October 24, 2014 updating the scoping period from the originally published 30 days to the corrected 45 days.

As part of the public involvement process, the Forest Service also listed the proposal in the quarterly Schedule of Proposed Actions (SOPA) beginning in October 2014. The proposed project has been presented to the Nez Perce Tribe at quarterly staff-to-staff meetings since November 2014.

The Proposed Action was initially developed as a result of preliminary issues, concerns, and existing conditions that were identified by the Interdisciplinary Team (IDT). The IDT used issues raised by the public, other agencies, and the Nez Perce Tribe to develop the scope of the actions, alternatives, and effects to consider in the Environmental Impact Statement (EIS). Many of the issues would be addressed through project design criteria and resource protection measures. Fifteen comment documents were received during the initial 45-day Scoping Period.

The Draft Environmental Impact Statement (DEIS) was advertised for a 45-day public comment period in April 2015. Eighteen comment documents (letters and emails) were received. Those comments were addressed in the original FEIS.

A legal notice advertising the start of a 45-day objection period was published in the *Lewiston Morning Tribune* on October 9, 2015. Three objections were accepted by the Region 1 Regional Forester. An Objectors Meeting, which was open to the public, was held between Region 1, the Nez Perce-Clearwater National Forests, and the objectors on January 4, 2016. As instructed by the Regional Forester, the Forest updated the Record of Decision (ROD) and FEIS analysis. The updated FEIS was posted on the Forest website in January 2016. The Johnson Bar ROD was signed on February 17, 2016.

In March 2016 a complaint requesting a Preliminary Injunction was filed with the United States District Court for the District of Idaho and a decision was issued in May 2016 granting the injunction. An agreement was reached between the parties and a Motion to Dismiss was granted in July 2016. At that time the ROD and accompanying project specific consultations were withdrawn as part of the agreement. An NOI was published in the *Federal Register* on September 16, 2016 advising the public that a SEIS was being prepared by the Forest Service to supplement the original FEIS analysis in response to the Preliminary Injunction.

1.7 Issues

The Forest Service separated the issues into two groups (significant and non-significant) in developing the alternatives for the original EIS. Significant issues were defined as those directly or indirectly caused by implementing the Proposed Action. Non-significant issues were identified as those outside the scope of the Proposed Action; already decided by law, regulation, Forest Plan, or other higher level decision; irrelevant to the decision being made; or conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Section 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Section 1506.3)…" A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project/administrative record.

Several concerns raised by the IDT and by the public during scoping were used to develop Alternatives to the Proposed Action. Besides Alternative 1 – No Action and Alternative 2 – Proposed Action, two additional alternatives, Alternative 3 – Reduced Ground Disturbance and Alternative 4 – No Harvest in the Wild and Scenic Corridor, were developed to address these concerns. These alternatives are being carried forward in this supplemental EIS. For a complete explanation of the issues used to develop the action alternatives please see the original FEIS, January 2016.

As a result of continued deterioration of the available timber, only those acreages with viable timber are analyzed under the action alternatives in Chapter 3. The analysis for the No Action Alternative has not changed; therefore, this SEIS incorporates the original FEIS No Action analysis by reference.

1.8 Scope of the Analysis

The Code of Federal Regulations (40 CFR 1508.25) requires the Forest Service to consider three types of actions (connected, similar, and cumulative) to determine the scope of the analysis.

Connected Actions are those actions that are closely related and are part of a larger action. One action would not occur without the other components. Overall, the Proposed Action and the Alternatives are not an interdependent part of a larger action.

Similar Actions are those actions which, when viewed with other reasonably foreseeable proposed actions, have similarities that provide a basis for evaluating their environmental consequences together, but are not necessarily connected. The salvage harvest and road decommissioning for the Johnson Bar proposal are considered similar actions, due to each having similar time frames, geographic areas, and purposes.

Cumulative Actions are those actions, which when viewed in conjunction with other past, present, and reasonably foreseeable future actions would result in effects having cumulative effects; and therefore, should be discussed in the same analysis. A table listing all known past, present, and reasonably foreseeable future actions overlapping the temporal and spatial bounds of the proposal is located in Chapter 3.

1.9 Project Record Availability

An important consideration in preparation of this EIS has been the reduction of paperwork as specified in 40 CFR 1500.4. In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental effects as a result of implementing any of the proposed alternatives and how these effects would be mitigated. More detailed information is located in the project record and the original FEIS of January 2016. The original FEIS is incorporated into this SEIS by reference, and is available for public inspection at the Nez Perce-Clearwater National Forests, Supervisor's Office, 903 3rd Street, Kamiah, Idaho 83536; or online at http://www.fs.usda.gov/project/?project=45214.

Chapter 2. Alternatives, Including the Proposed Action

2.1 Introduction

This chapter describes and compares the alternatives considered for the proposed Johnson Bar Fire Salvage Project. For a discussion of the alternatives eliminated from detailed analysis please see the original FEIS, January 2016. This comparison will address differences between the alternatives and provide a clear basis for decision making by the Responsible Official. Maps for each of the alternatives analyzed in detail are included in Appendix A – Maps.

In developing the proposed project, the IDT used a restoration based framework to evaluate areas that were suitable for harvesting; first identifying areas of 60% or greater mortality that could be economically accessed, and then removed areas with a high potential for mass wasting (landslides, unstable slopes, etc.) or that could contribute to additional unwanted effects if harvested. Design criteria were developed to address social concerns, such as aesthetics and recreation, as well as to further minimize or avoid adverse effects to Outstanding Remarkable Values (ORVs) including water quality, fish, and soils and Threatened, Endangered, or Sensitive (TES) species.

2.2 Alternatives Considered in Detail

The Forest Service developed four alternatives in response to public scoping and issues raised as a result of IDT input. These alternatives consist of the No Action Alternative (Alternative 1), Proposed Action (Alternative 2), Reduced Ground Disturbance (Alternative 3), and No Harvest in Wild and Scenic Corridor (Alternative 4). All alternatives were given equal weight, and any remaining issues considered were used to modify the action alternatives.

2.2.1 Alternative 1 – No Action

Under the No Action alternative, neither the Proposed Action nor the other alternatives would be implemented and current management actions would continue to guide management of the project area. Along with this alternative providing a baseline for comparison of the environmental effects as a result of potential implementation of the other alternatives (36 CFR 1502.14), the No Action alternative is potentially an appropriate management option that could be selected by the Responsible Official.

The No Action alternative was analyzed in detail for all resources in the original FEIS, January 2016, and remains applicable. This SEIS incorporate that analysis by reference; therefore, only changed circumstances resulting in additional effects as a result of the No Action alternative will be carried forward in this SEIS.

2.2.2 Activities Common to all Action Alternatives

The following actions would be included as a component of all of the action alternatives.

- Harvest activities would include 51 miles of road maintenance/reconditioning, to include removal of brush, clearing of culvert inlets, grading of roads for water flow control, and the removal of closure barriers as needed; and 5.6 miles of road reconstruction involving spot culvert replacements.

- Decommissioning of 21.2 miles of non-system and system roads;
- Long-term storage of 4.7 miles of system roads;
- Use existing helicopter service landings (three for Alternatives 2 and 3, and two for Alternative 4);
- Salvage harvest would consist of variable retention, with 20-85% of the trees being removed; and
- Project Design Criteria; and
- Monitoring.

2.2.2.1 Design Criteria

Post-fire landscapes can be extremely delicate and fragile, particularly in areas burned at high intensity. As such the IDT, with the use of best available science and in consultation with the US Fish and Wildlife Service, National Marine and Fisheries Service, and the Nez Perce Tribe, developed the following design criteria, which would be included as components common to all action alternatives. These design criteria aid in protecting and enhancing ORVs for the Middle Fork Clearwater (including Selway) Wild and Scenic River.

Table 2. Johnson Bar Fire Salvage project design criteria

Soil Resources	
1. .	Landslide prone areas have been mapped and field verified in the harvest units. These landslide prone areas would be further delineated in the field, would be excluded during unit layout, and would receive a PACFISH buffer (Nez Perce National Forest Plan as amended by PACFISH 1995). Indicators of landslide prone areas include: steep (over 60%) concave slopes; hydrophytic vegetation (i.e. sedges, moist site ferns); slumps, draws, and basins; past landslide locations; and obvious soil movement areas (typically indicated by curved and/or buttressed tree boles, soil creep, tension cracks, etc.). No harvest activities would occur in these areas.
2.	In all units, to reduce ground disturbance, no ground based skidding would be allowed on slopes over 35%.
3.	For all harvest units, coarse woody material appropriate to the site would be retained for maintaining soil moisture, soil stability, and other soil physical and biological properties after all unit activities. Regional guidance for organic matter recommends the following guidelines, such as retaining coarse woody material (> 3-inch diameter) to maintain soil productivity (Graham et al. 1994). Moister habitat types require 17–33 tons/acre. Approximately 14–28 standing trees per acre would be retained for future down wood recruitment. Non-merchantable snags or other designated retention trees felled for safety reasons would be left in the unit.
4.	Landings, skid trails, and slash piles would be located in suitable sites to avoid, minimize or mitigate potential for erosion and sediment delivery to nearby waterbodies. Skid trails would not be placed within an RHCA or landslide prone areas. Only existing landings would occur within RHCAs.
5.	Erosion control and sediment plans would cover all disturbed areas, including skid trails and roads, landings, cable corridors, temporary road fill, water source sites, borrow sites or other areas disturbed during harvest operations.
6.	Use suitable species and establishment techniques to cover or vegetate disturbed areas in compliance with local direction and requirements for vegetation ecology and prevention and control of invasive species. Prevention and control of invasive plants

	within the project area would be consistent with the Nez Perce National Forest's Invasive Plants Treatment Project Record of Decision (1988).
7.	Install sediment and stormwater controls prior to initiating surface disturbing activities to the extent practical.
8.	Operate equipment when soil compaction, displacement, erosion and sediment runoff would be minimized (dry or frozen ground). Avoid ground equipment operations on highly erosive, unstable, wet or easily compacted soils and steep slopes as described per Nez Perce National Forest Plan (USDA, 1987).
9.	Road blading would only be done when necessary. Ditches would not be routinely bladed, and exposed soil areas on road prisms, ditches, cuts, and fills would be seeded as necessary to control erosion.
10.	In areas of high and moderate wildfire burn severity or where the litter and duff layers have been removed by fire, slash would be left on site to provide for erosion and soil productivity protection. A ground cover of 85% should be maintained on site with both fine (approximately 5-10 tons/acre) and coarse woody debris.
11.	Winter Logging a. Conduct winter logging operations when the ground is frozen or snow covered and depth is adequate to avoid rutting or displacement of soil. b. Leave a minimum of 2 inches of snow on road surfaces. Leave drainage points (breaches) in snow berms at regular intervals to avoid concentrated snow melt runoff onto road surfaces. c. Avoid locating skid trails on steep areas where frozen skid trails may be subject to soil erosion the next spring.
12.	Cable and Aerial Yarding Operations: The majority of the units would use cable/aerial yarding operations to avoid soil disturbance and erosion risks. Given this method, soil disturbance and erosion risks from these systems are primarily confined to cable corridors and landings. a. Any exposed soil resulting from skyline logging corridors would be stabilized by placing slash over the area to achieve at least 95% coverage and by installing waterbars if trenching occurs. b. Locate cable corridors to efficiently yard materials with the least soil damage c. Use suitable measures to minimize soil disturbance when yarding over breaks in slope (i.e. intermediate supports). d. Yarding operations would be postponed when soil moisture levels are high if the specific type of yarding system results in unacceptable soil disturbance and erosion within cable corridors.
13.	Ground-Based Skidding and Yarding Operations: For units with potential ground based operations, the following design criteria would be implemented in order to minimize soil erosion and soil productivity effects: a. Use of designated skid trails and harvest systems as approved by the soils specialist, such as re-use of existing disturbance, operating on a slash mat, and shovel logging systems. b. Activities would be restricted when soils are wet to prevent resource damage (indicators include excessive rutting, soil displacement, and erosion). Use of heavy equipment would be suspended when soil is too wet to support heavy equipment without detrimental resource damage. c. Directionally fell trees to facilitate efficient removal along pre-designated yarding patterns with the least number of passes and least amount of disturbed area.

	d. For all harvest units, decompaction would be required on skid trails where excavation or ground disturbance has occurred or where successive passes have taken place over the same trail. Decompaction would be conducted to improve soil productivity and meet Regional soil quality standards. Decompaction would span the width of the compacted areas and extend to a depth of 10–18 inches, to effectively loosen the ground to allow water penetration and revegetation and to prevent the rocky sub-surface soils from mixing with the topsoil. The depth of decompaction should be adjusted to avoid turning up large rocks, roots, or stumps. Equipment would not be permitted to operate outside the clearing limits of the skid trail. No decompaction work should be done during wet weather or when the ground is frozen or otherwise unsuitable.
Wildlife	
14.	All temporary roads would be closed to the public and decommissioned following use.
15.	No old growth would be harvested.
16.	Maintain a minimum 40-acre yearlong no-treatment buffer around occupied goshawk nest trees. No ground disturbing activities would be allowed inside occupied post-fledgling goshawk areas (minimum distance of 440 acres around the nest stand) from April 15 to August 15.
17.	If an active bald eagle nest is detected in or near the Johnson Bar Fire Salvage Project Area, all activities within ½ mile and up to 2 ½ miles from the nest would be postponed during the period of February 1 to August 15. No harvest would occur within ½ mile of an active bald eagle nest. This would allow for the nesting and rearing period of the recent eagle clutch to occur without external disturbances or displacement from project activities.
18.	Large snags [≥ 15 inches diameter at breast height (DBH)] should be retained for all units if possible. The modified Northern Regional Snag Guidelines suggest leaving at least 4 snags (15-20 inches DBH) and 1.6 snags (≥20 inches DBH) average per acre (Bollenbacher, *et al.* 2009) across the project area. It would be more favorable for wildlife if the retained snags occurred in clusters. In units that are lacking the sufficient quantity of snags, keep enough possible snags and live trees with large DBH for recruitment snags.
19.	If a den, nest sites, or other important habitat feature of any threatened, endangered, or sensitive species were to be discovered within or in close proximity to any treatment unit, project activities would be coordinated with a wildlife biologist so that appropriate conservation measures could be developed.
Aquatics	
20.	No timber harvest would occur within 300 feet of fish-bearing streams, 150 feet of perennial non-fish bearing water, 100 feet of intermittent streams, 100 feet from landslide prone areas, and a 150 foot slope distance from the edge of wetlands larger than one acre.
21.	Contractors would have spill prevention and containment materials on site with stationary equipment and at fueling and maintenance sites to minimize the risk of an accidental spill of petroleum products, as well as to protect water courses and aquatic biota from adverse effects in the event of a spill. Spill prevention and containment materials would be accessible for non-stationary equipment while on National Forest System lands.
22.	Helicopter refueling and serving could occur in RHCAs, 150 feet from water bodies on existing helicopter landing sites. These actions are similar to common fire practices

	and mitigation measures outlined in the Nez Perce National Forest Fire Programmatic (NMFS 1999) and FWS #1-4-99-I-154 would apply.
23.	Equipment staging, parking, servicing, and refueling would be outside of Riparian Habitat Conservation Areas (RHCAs) and in designated areas.
24.	Dust abatement (chemical and water application) would be used on major haul routes to minimize sediment input to streams from log hauling activities. It would be applied the same year that log hauling occurs and would follow design criteria in the Nez Perce-Clearwater National Forests programmatic road maintenance consultation (1999). Magnesium chloride (MgCl2) is typically used during chemical application. For MgCl2 applications, a 1-foot buffer zone would be applied on the edge of gravel allowed by the road width. The source location, quantity, and timing of dust abatement would be approved by the Forest Service before sale, in order to protect water resources during low flows. Water pumps intakes must be screened and no more than 30% of streamflow shall be pumped and water drafting at any site shall not exceed 10 hours per day and not exceed 3 consecutive days.
25.	Conduct an IDT review during sale layout and contract preparation to ensure that the BMPs and additional project design criteria are incorporated into the layout and timber sale contract.
26.	Riparian Habitat Conservation Areas: a. Roadside hazard trees within streamside RHCAs felled for safety purposes would be left onsite. Roadside hazard trees on landslide prone RHCAs felled for safety purposes would be left onsite, unless it is determined that they would create a hazardous fuels situation, in which case the tree(s) may be removed following coordination with the soils and watershed specialist to ensure they can be removed without causing unacceptable soil effects or creating erosion concerns. Non-roadside hazard trees within all RHCAs felled for safety reasons would be left onsite. b. There would be no new road construction within RHCAs. All temporary road construction would be on existing road templates or on or near ridge tops. There would be no connectivity to the stream network, which would avoid concentrated flows and sediment transport to nearby waterbodies. c. No yarding operations would occur through RHCAs. d. Heavy equipment refueling and servicing would be outside of RHCAs.
27.	Ground-Based Skidding and Yarding Operations: a. Locate skid trails to avoid concentrating runoff and provide breaks in grade. b. No equipment operations would occur in burned ephemeral draws. c. During winter operations, install suitable erosion control on skid trails prior to spring runoff.
28.	Landings: Landing locations are selected for least amount of excavation and erosion potential, where sidecast would neither enter drainages nor damage other sensitive areas. a. Locate landings outside of the RHCAs and avoid locating landings on steep slopes or highly erodible soil. b. Design roads and trail approaches to avoid overland flow entering the landing. c. Existing landings would be used where possible. d. Newly constructed landings would be obliterated after use.
29.	Haul Routes: a. Haul routes would be maintained to BMP standards, including proper drainage, adequate stream culvert capacity, cleared and functional cross-drains. Space cross drains within 100 feet on either side of stream crossings.

	b. Ensure that road drainage would be directed to areas of undisturbed forest floor, and not directly into a waterbody. c. Avoid hauling and other heavy equipment traffic during road conditions when the road surface rutting would occur. d. Sediment filtering devices (e.g., wattles, weed-free straw bales, filter fences, etc.) would be used as needed to limit erosion and delivery of sediment from roads into streams and ephemeral drainages. e. Snowplowing: • Leave a minimum of approximately 2 inches of snow on road surfaces; • Do not side-cast snow into any stream channel; • Leave drainage points (breaches) in snow berms to avoid concentrated snow melt runoff onto road surfaces; • Do not operate vehicles or equipment on snow-covered roads during warm/soft conditions to avoid setting ruts.
30.	Temporary Roads: a. Temporary roads would be constructed on or near ridge tops with no stream crossings and would be hydrologically disconnected from any stream network. All temporary roads would be constructed and then obliterated within 2 operating seasons. Obliteration includes de-compaction, re-contouring where needed and the application of woody material onto the de-compacted surface to provide for soil productivity and limit erosion potential. There would be no road construction in RHCAs and roads would be located to avoid adverse effects to soil, water quality and riparian resources. b. Maintain the natural drainage pattern of the area wherever practical; apply soil protective cover on disturbed areas. c. Temporary roads would be inspected to verify that erosion and stormwater controls are implemented and functioning and are appropriately maintained. d. All temporary roads would be scarified and decommissioned (all new construction would be recontoured; existing prisms would be placed in a stable condition through recontouring and/or decompaction). Cut/fill slopes and crossings would be reshaped to natural contours. Available slash and coarse wood material (>3 inches) would be applied to the recontour surface (slash is considered “available” where the equipment can reach it from the working area where the decommissioning is occurring). Temporary road rehabilitation work shall begin as soon as possible after the timber harvest operations have been completed. They are not intended to be left open for post –harvest treatment activities, such as site preparation, burning or planting. e. If temporary roads are to be left open over winter, they should be winterized using appropriate soil stabilization methods, including additional erosion control measures that may include seeding, mulching, slash coverage, filter windrows, outsloping, or extra waterbarring.
31.	Road Storage: a. There would be measures to close and/or physically block the road entrance so that unauthorized motorized vehicles cannot access the road. b. Apply effective ground cover on disturbed sites to avoid or minimize accelerated erosion if needed.
32.	Road Decommissioning a. Road decommissioning and culvert replacements would adhere to the Stream Crossing Programmatic with conservation measures (USFWS W00-20120F-0015, MNFS No. 2011/05875) and Nez Perce-Clearwater National Forests

	standard road decommissioning protocols. During road decommissioning or culvert replacements, measures to minimize sediment delivery to streams would be undertaken, such as: (a) placing removable sediment traps below work areas to trap fines; (b) when working instream, removing all fill around pipes prior to bypass and pipe removal (where this is not possible, use non-eroding diversion); (c) revegetating scarified and disturbed soils with weed-free grasses for short-term erosion protection and with shrubs and trees for long-term soil stability; (d) utilizing erosion control mats on stream channel slopes and slides; (e) mulching with native materials, where available, or using weed-free straw to ensure coverage of exposed soils; (f) dissipating energy in the newly constructed stream channels using log or rock weirs; and (g) armoring channel banks and dissipating energy with large rock whenever possible. b. Implement suitable measures to re-establish stable slope contours, and surface and subsurface hydrologic pathways where necessary to the extent practicable to avoid or minimize adverse effects to soil, water quality and riparian resources. c. Implement measures to promote infiltration of runoff and intercepted flow and/or desired vegetation growth on the road prism and other compacted areas.
33.	Use of Prescribed Fire a. Locate slash piles in areas previously disturbed so they do not interfere with natural drainage patterns and limit the damage to residual trees. b. Jackpot burning for site preparation should only be considered under the following circumstances: • Areas of low wildfire burn severity with intact litter and duff layers; • Areas of low soil erosion hazard rating; and • Slopes less than 55%.
Heritage Resources	
34.	Halt any ground disturbing activities if cultural resources are discovered until a Forest Service approved Archaeologist can properly evaluate and document the resources in compliance with 36 CFR 800.
Range	
35.	Move livestock away from the Road 1119A area (Unit 114) when harvesting activities are occurring, and for one to three years following reforestation, to eliminate any potential conflicts.
Recreation	
36.	Use of helicopter landings located within the Lochsa and Selway Wild and Scenic River corridors would be limited to low recreation use periods (November 1 – April 15; this may overlap with Wildlife timing restrictions for bald eagles). Helicopter landings located at Wild Goose and Johnson Bar Campgrounds would be used only one season each. Each site would be fully rehabilitated (debris removed and surfaced returned to pre-use conditions) by May 15. Other landing sites within the river corridors, such as Two Shadows, would be rehabilitated within 6 months of last use, including any required slash removal, grading, seeding, rock replacement and paving.
37.	Between June 1 and October 15 of each year’s projected activities, at least one access route (Road 286 or 651) to Lookout Butte Rental would be available for Forest visitors to use and access the site.
38.	Designated trails 706, 712, 715, and 716 would be identified as protected improvements. Following harvest activities, any effects to these trails would be restored to the same useable condition they were prior to the activity taking place.

39.	Where necessary for public safety, recreation access for activities, such as mushroom hunting/collecting, dispersed camping, hunting, and other activities would be restricted during harvest operations.
40.	If the groomed snowmobile route is used for winter log hauling an alternate parking location would be provided for snowmobilers. Location would be coordinated with the Idaho County Groomer Board and Valley Cats Snowmobile Club.
41.	Dispersed campsites at helicopter landings H17, H18, and H19 would be restored following use. Restoration of campsites may include removal of slash and debris and creation of a relatively flat area suitable for camping, similar to pre-use conditions. These are existing landings that would not be obliterated after use.
Vegetation	
42.	Tree retention would be based on the Nez Perce-Clearwater Tree Mortality Guidelines which outlines the causes of direct mortality and secondary fire mortality.
43.	All live trees would be designated as “leave trees”.
44.	Salvage dead trees leaving 14-28 live or dead reserve trees per acre.
45.	Plant 300-400 trees/acre.
Noxious Weeds	
46.	The spread of invasive plants would be minimized by chemically treating any noxious weed populations along the existing road systems before and after project implementation. The Collaborative Forest Landscape Restoration Program (CFLRP) is a partnership between the Forest Service, Idaho County, and local groups that works on containing or eliminating noxious weeds within Forest Service and County roads, camp grounds, trailheads, and administrative sites. Burned Area Emergency Response (BAER) weed treatments were conducted in 2015 by Forest Service crews on all weed infested roads within the Johnson Bar Fire Area, whether or not the Johnson Bar Fire Salvage Project is implemented. Herbicide treatments will tier to the Nez Perce National Forest Noxious Weed Programmatic (NMFS No. 2008/03330).
47.	Any equipment would be washed of loose dirt and debris prior to entering the project area to prevent “new invader” weed establishment.
48.	Project related exposed soils would be revegetated on landings, skid trails, and cut slopes with Certified Weed Free Seed and only use Certified Weed Free Straw as mulch.
Scenic Quality Harvest unit boundaries that are visible from critical viewpoints, such as Highway 12, Fenn Ranger Station, Fenn Pond, Johnson Bar Campground, Wild Goose Campground, Three Devils Picnic Area, and the Selway River Road, and from both the Middle Fork Clearwater and Selway Wild and Scenic Rivers would be designed to meet the Forest Plan visual quality objectives for these visually sensitive areas. Design criteria used to reduce the visual effect of the harvest areas include, but may not be limited to the following:	
49.	Vertical structure within the harvest units would be maintained and feathered edge treatments would be used to emulate natural openings in areas visible from critical viewpoints and travel corridors. Leave trees that provide vertical structure within the harvest area, may be both live and dead trees emulating the same structure that would remain after a natural mixed severity wildfire. These leave areas would be grouped in retention areas ranging from ¼ to 3 acres in size and may include leave areas adjacent to unit boundaries. Unit boundaries for openings visible in the foreground would be shaped and feathered to reduce any unnaturally shaped edges and would reduce the hard edges that appear as a man-made features on the landscape.

50.	Foreground screening vegetation along the Swiftwater Road would be protected whereever possible. Protection of screening vegetation at these critical areas would be important during harvesting activities.
51.	Location of skyline corridors and skid trails would be designed to minimize visual effects.

2.2.2.2 Monitoring

The following monitoring activities would be initiated as a component of the proposed project:

1. Once the project has been implemented it should be reviewed in the field by the Landscape Architect to determine how well it meets the forest plan visual quality objectives. Of greatest concern would be the visual effects of post-harvest burning on reserve trees within the units, feathering of edges to create natural appearing openings and reduction of visual effects of skyline logging systems. This review would then be documented in the Forest's Monitoring Report.
2. Temporary roads would be inspected by the Sales Administrator to verify that erosion and stormwater controls are implemented and functioning prior to log hauling, and are appropriately maintained during the hauling.
3. Implementation monitoring or road reconstruction and reconditioning activities will occur prior to hauling on any reconstructed segments on which hauling is scheduled to occur. The monitoring would verify that the implementation of proposed activities and design criteria has addressed sources of sediment and reduced sediment delivery from these sources prior to hauling activities commencing.
4. Annual cobble embeddedness (CE) monitoring on Swiftwater, Elk City, Goddard and O'Hara Creeks would continue through 2020. Baseline cobble embeddedness surveys were conducted in 2014, 2015 and 2016 on each of these streams. Monitoring will continue at each site 2 years past the last harvest.
5. Soil plots were established to measure differences in soil disturbance among varying logging systems by burn severity. Soil plots were also established to measure spatial and temporal changes in soil erosion by burn severity. Monitoring is ongoing, before implementation of the project, during, and post implementation.
6. Post implementation effectiveness monitoring of target stands and Design Criteria would be performed as an interdisciplinary team at selected harvest units.
7. Resource specialists would conduct field evaluations of selected tractor logging units during harvest operations.
8. Specialists would evaluate the effectiveness of soil erosion prevention and control measures.
9. Evaluation of treatment of invasive plant species monitoring is conducted by the noxious weed program.

2.2.2.3 Forest Monitoring in the area.

The following monitoring is already taking place as part of continuing Forest Plan monitoring.

1. PACFISH/INFISH Biological Opinion (PIBO) effectiveness monitoring will be ongoing (3-5 year rotation) within the Selway and Middle Fork Clearwater subbasin. There is one PIBO EM site located within the specific Project Area, located on

Goddard Creek. Six additional PIBO sites (referenced and managed sites) were added to the Selway River basin.

2. A Forest Plan Monitoring Site was established on O'Hara Creek. PACFISH riparian management objectives (RMOs) along with fish density are measured on an annual basis -.
3. Temperature monitoring would continue in the lower Selway Watershed (Selway River and O'Hara Creek).

2.2.3 Alternative 2 – Proposed Action

Under Alternative 2 the Forest Service originally proposed harvesting 3,096 acres in the FEIS. As a result of additional degradation of the timber the remaining viable acres have been reduced to 2,348 acres, which are being analyzed in this SEIS. This is approximately 8.8% of the project area and a 24.2% reduction in the amount of acreage being proposed for harvest.

From the remaining viable acres harvest activities would consist of 105 acres tractor logging, 915 acres skyline logging, and 1,328 acres helicopter logging. Activities would also include 5.6 miles of system road reconstruction, to include culvert replacement, spot surfacing, stabilization of Road #470, installation of cross-drainage on Road #9723B, installation of culverts on Road #653A, and opening of stored Road #470B. Any additional haul roads being utilized as part of the proposed project would consist of County and State highways. The Proposed Action would utilize 3.4 miles of new and existing temporary roads, 4.4 miles of new and existing swing trails, and 6 new and 11 existing helicopter landings.

2.2.4 Alternative 3 – Reduced Ground Disturbance

In response to comments received during the Scoping process regarding potential sedimentation in the Selway and Middle Fork Rivers, the Forest Service developed Alternative 3. Under the original FEIS Alternative 3 the Forest Service proposed harvesting 2,710 acres; however, as a result of continued deterioration of the timber the remaining viable acres have decreased to 1,988 acres, which are being analyzed in this SEIS. This equates to 7.4% of the project area and a 26.6% reduction in the amount of acreage being proposed for harvest.

Of the remaining acres, harvest activities would consist of 23 acres tractor logging, 432 acres skyline logging, and 1,533 acres helicopter logging. Activities would also include 5.6 miles of system road reconstruction, to include culvert replacement, spot surfacing, stabilization of Road #470, installation of cross-drainage on Road #9723B, and installation of culverts on Road #653A. Any additional haul roads being utilized as part of the proposed project would consist of County and State highways. Alternative 3 would utilize approximately 0.2 mile of existing temporary roads, approximately 0.3 mile of new swing trails, and 3 new and 11 existing helicopter landings.

2.2.5 Alternative 4 – No Harvest in Wild/Scenic Corridor (Preferred Alternative)

Alternative 4 was developed in response to internal and external comments received during the Scoping process regarding harvesting within the Wild and Scenic River Corridor, visual impacts from harvest along the Corridor, impacts of helicopter landings along Highway 12 and the Selway River Road, and economic feasibility. Under the original FEIS Alternative 4 the Forest Service analyzed 2,207 acres; however, as a result of continued deterioration of the timber, acreage decreased to 1,349 acres, which are being analyzed in this SEIS. This equates to 5% of the entire project area and a 38.9% reduction in the amount of acreage being proposed for harvest.

Of the remaining acres, harvest activities would consist of 108 acres tractor logging, 772 acres skyline logging, and 469 acres helicopter logging. Activities would also include 5.6 miles of system road reconstruction, to include culvert replacement, spot surfacing, stabilization of Road #470, installation of cross-drainage on Road #9723B, installation of culverts on Road #653A, and opening of stored Road #470B. Any additional haul roads being utilized as part of the proposed project would consist of County and State highways. Alternative 4 would utilize approximately 2.9 miles of new and existing temporary roads, 4.4 miles of new and existing swing trails, and 3 new and 6 existing helicopter landings.

2.3 Comparison of the Alternatives

2.3.1 Summary Comparison of Alternatives

Table 3 provides a comparison between the alternatives.

Table 3. Summary comparison of the potential activities of implementing each of the proposed alternatives.

Activity	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fire salvage harvest (acres)	0	2,348	1,988	1,349
Haul roads; Road maintenance/reconditioning (miles)	0	51	51	51
Haul roads; System road reconstruction (miles)	0	5.6	5.6	5.6
Total haul roads used on USFS administered lands (miles)	0	62	62	62
Temporary roads – existing template (miles)	0	0.6	0.2	0.3
Temporary Roads – New Construction (miles)	0	2.8	0	2.6
Tractor swing trails (miles)	0	4.4	0.2	4.4
Tractor logging system (acres)	0	105 (4%)	23 (1%)	108 (8%)
Skyline logging system (acres)	0	915 (39%)	432 (22%)	772 (57%)
Helicopter logging system (acres)	0	1,328 (57%)	1,533 (77%)	469 (35%)
EXISTING Helicopter landings	0	11	11	6
NEW Helicopter landings	0	6	3	3
Site preparation and reforestation (acres)	0	2,348	1,988	1,349

Activity	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Road decommissioning system and non-system roads (miles)	0	21.2	21.2	21.2
Road storage system roads (miles)	0	4.7	4.7	4.7

2.3.2 Summary Comparison of Alternative's Effects

This section provides a summary of the effects of implementing each alternative. Information in Table 4 is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 4. Comparison of effects by alternative

Issue and Resource Indicator	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Vegetation				
Percent in early seral species component	16%	24%	23%	20%
Soils				
Acres of harvest on terrain rated as high hazard for surface erosion	0	117 (5%)	93 (5%)	36 (3%)
Miles of temporary road or swing trail construction on soil rated as high hazard for subsurface erosion	0	2	0.2	2
Total acres of new DSD	0	82	60	39
Number of harvest units requiring specialized project design criteria to meet Regional soil standards	0	0	0	0
Hydrology				
Percent sediment yield cumulative increase over base (existing and proposed activities)				
Browns Spring Creek	5	14	10	14
Decker Creek	3	6	5	4
Elk City Creek	5	14	9	13
Goddard Creek	2	7	5	7
Hamby Creek	3	8	6	8
Lodge Creek	17	23	21	23
Lower O'Hara Creek	3	15	7	15
Lower Selway River	4	11	8	10
Middle Fork Clearwater Face	2	3	34	3
Pine Knob Creek	21	26	24	26
Swiftwater Creek	5	32	13	31
Unnamed No. 8	2	7	6	8
Road density (mi/mi^2)				

Issue and Resource Indicator	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Decker Creek	0.5	0.5	0.5	0.5
Elk City Creek	2.6	1.0	1.0	1.0
Goddard Creek	1.7	1.4	1.4	1.4
Lodge Creek	4.5	4.1	4.1	4.1
Lower O'Hara Creek	1.6	1.2	1.2	1.2
Lower Selway River	1.5	1.5	1.5	1.5
Middle Fork Clearwater Face	2.1	2.1	2.1	2.1
Swiftwater Creek	2.9	2.4	2.4	2.4
Unnamed No. 8	1.2	1.2	1.2	1.2
Fisheries				
Number of Road/Stream crossings	228	158	158	158
Percent Increase in Cobble Embeddedness as Modeled by FISHSED				
Lower O'Hara	0	1	1	1
Goddard Creek	0	1	1	1
Elk City Creek	0	1	1	1
Swiftwater Creek	0	3	1	3
Lower Selway River	N/A	N/A	N/A	N/A
Lodge Creek	0	2	2	2
Unnamed No.8	N/A	N/A	N/A	N/A
Decker Creek	0	0	0	0
Middle Fork Clearwater Face	N/A	N/A	N/A	N/A
Percent Reduction in Summer Rearing Habitat by Alternative				
Lower O'Hara	0	-1	-1	-1
Goddard Creek	0	0	0	0
Elk City Creek	0	-1	-1	-1
Swiftwater Creek	0	-1	-1	-1
Lower Selway River	N/A	N/A	N/A	N/A
Lodge Creek	0	-1	-1	-1
Unnamed No.8	N/A	N/A	N/A	N/A
Decker Creek	0	0	0	0
Middle Fork Clearwater Face	N/A	N/A	N/A	N/A
Percent Reduction in Winter Rearing Habitat by Alternative				
Lower O'Hara	0	-1	-1	-1
Goddard Creek	-6	0	0	0
Elk City Creek	0	-1	-1	-1
Swiftwater Creek	0	-2	-1	-2
Lower Selway River	N/A	N/A	N/A	N/A
Lodge Creek	0	-1	-1	-1
Unnamed No.8	N/A	N/A	N/A	N/A
Decker Creek	0	0	0	0
Middle Fork Clearwater Face	N/A	N/A	N/A	N/A
Scenic Quality				

Issue and Resource Indicator	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Meet adopted visual quality objectives (VQOs)	Would meet VQOs for the area, but the scenic character of the area would continue to be affected by increases in dead and dying vegetation due to fire activity in the area. The area would also continue to be susceptible to further catastrophic wildfire. Over time the fire damaged vegetation will deteriorate and openings will be formed where the fire severity was moderate to high as trees continue to fall. These openings would look similar to the openings in the Meadow Creek drainage.	Although harvest activities would be visible from critical viewsheds throughout the project area, the harvest proposal would meet the VQO of retention in the foreground and partial retention in the middleground from the WSR corridors and along the Swiftwater Road. Design measures would be used to create openings that emulate the effects of natural processes. Areas outside critical viewsheds would meet the VQO of modification. Long term goals of a more healthy and resilient forest would be accomplished through planting of seral species which would improve the scenic character over time.	Proposed harvest would be reduced slightly from alternative 2 with the elimination of unit 116 within the Selway River foreground viewing zone. This alternative has the lowest percentage of skyline harvest methods and the highest percentage of helicopter harvest. Harvest activities would be visible from most viewpoints, but proposed units would have design measures to insure that openings have the appearance of openings created by natural processes.	Proposed harvest would be reduced, especially in the U.S. Highway 12 viewing zone. There would be no harvest within the Wild and Scenic River boundaries. Harvest units within the retention VQO of the Selway River would also be reduced. This alternative has the highest percentage of skyline harvest methods, but design measures would reduce the visual effects of the harvest. Harvest activities would be visible from most viewpoints, but proposed units would have design measures to insure that openings have the appearance of openings created by natural processes.

Issue and Resource Indicator	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Scenery Wild and Scenic River ORV	No harvesting would occur within the designated Wild and Scenic boundary but natural processes that create openings would continue to change the vegetative character of the area.	There are eight units that are partially within the boundary of the Wild and Scenic River. All of these units are also partially within the area that borders the Wild and Scenic River boundary. There are also seven additional units that border the Wild and Scenic River corridor, but do not have any openings within the boundary. There are sixteen units that may be partially visible from the Wild and Scenic River but do not border the boundary. There are 3 existing helicopter landings that will be utilized in the Wild and Scenic River corridor. Harvest units will be designed to emulate natural openings created by fire activities and will be replanted to encourage a more resilient forest environment in the future.	There are eight units that are partially within the boundary of the Wild and Scenic River. All of these units also have parts of the unit that are in the area that borders the Wild and Scenic River boundary. There are also six units that are bordering the Wild and Scenic River corridor, but do not have any opening within the boundary. There are sixteen units that may be partially visible from the Wild and Scenic River but do not border the boundary. There are 3 existing helicopter landings that will be utilized in the Wild and Scenic River corridor. Harvest units will be designed to emulate natural openings created by fire activities and will be replanted to encourage a more resilient forest environment in the future.	There are no units or helicopter landings within the boundary of the Wild and Scenic River. There are 8 units that are bordering the Wild and Scenic River corridor. There are sixteen units that may be partially visible from the Wild and Scenic River but do not border the boundary. Harvest units will be designed to emulate natural openings created by fire activities and will be replanted to encourage a more resilient forest environment in the future.
Wild and Scenic River				
Acres harvested in WSR	0	185	160	0
Wildlife				

Issue and Resource Indicator	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Acres of species habitat affected as a result of the action alternatives (% of species habitat affected)				
American Marten	14,245	932 (7%)	882 (6%)	492 (3%)
Bald Eagle	3,648	395 (11%)	301 (8%)	152 (4%)
Black-backed Woodpecker	11,816	1,106 (9%)	838 (7%)	666 (6%)
Flammulated Owl	550	110 (20%)	83 (15%)	85 (15%)
Fringed Myotis	1,458	63 (4%)	35 (2%)	38 (3%)
Gray Wolf	26,700	2,348 (9%)	1,988 (7%)	1,350 (5%)
Long-eared Myotis Long-legged Myotis	2,404	174 (7%)	136 (6%)	143 (6%)
Northern Goshawk Nesting	11,650	851 (7%)	809 (7%)	465 (4%)
Pileated Woodpecker Nesting	1,664	80 (5%)	76 (5%)	15 (1%)
Shiras Moose	758	14 (2%)	14 (2%)	14(2%)
Economics				
Volume Harvested (CCF)	0	52,300	42,000	32,700
Volume Harvested (MBF)	0	31,600	24,900	19,400
Jobs Sustained	0	558	448	349
Appraised Value	0	$-1,831,000	$-2,798,000	$499,000
Sale Feasibility (Present Net Value)	0	-$3,764,000	-$4,337,000	-$848,000

2.4 Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received during the Scoping process provided alternative suggestions in order to achieve the purpose and need of the proposed project. Each alternative was reviewed to determine if it: (1) met the purpose and need; (2) addressed the issues; (3) whether or not the alternative was feasible; and (4) whether or not the alternative was consistent with the Forest Plan, laws, and regulations. For a complete description of the alternatives considered but eliminated from detailed analysis please see the original FEIS of January 2016, that in incorporated by reference into his SEIS.

Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

Chapter 3 summarizes the physical, biological, social, and economic environments of the project area and the potential changes to those environments as a result of implementing the proposed alternatives. It also presents the scientific and analytical basis for comparison of each alternative.

The SEIS incorporate the original FEIS by reference, as such the following resources are not being carried forward as the effects analyses have not changed from the original FEIS: Cultural, Fire and Fuels, Native American Tribes, Rare Plants, Recreation and Trails, Weeds, and Wilderness/Unroaded Areas. For a complete effects analyses of these resources please see the original FEIS, January 2016.

This section also summarizes the potential direct, indirect, and cumulative effects to the Affected Environment as a result of implementing the proposed alternatives. Effects may include ecological, aesthetic, historic, cultural, economic, social, or health. The potential effects may be beneficial or detrimental, and may result from actions possessing both beneficial and detrimental effects, even if on balance the effect would be beneficial (40 CFR 1508.8).

3.1.1 Direct and Indirect Effects

NEPA requires that Federal agencies take a “hard look” at significant environmental effects as a result of implementing a proposed action and any alternatives. The “hard look” requirement has been tempered through the “rule of reason”, which the Supreme Court has characterized as requiring an agency “to furnish only such information as appears to be reasonably necessary under the circumstances for evaluation of the project rather than to be so all-encompassing in scope that the task of preparing it would become either fruitless or well-nigh impossible” [*New York Natural Resource Defense Council, Inc. v. Kleppe,* 429 U.S. 1307, 1311 (1976), citing *Natural Resource Defense Council v. Calloway,* 524 F2d 79, 88 (2d Circuit 1975)].

Direct effects are the result of an action and occur at the same time and place. Indirect effects are the result of an action but occur later in time or are further removed in distance, yet are still reasonably foreseeable (40CFR 1508.8). In order for an affect to be considered reasonably foreseeable, it must be “sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision” [*Sierra Club v. Marsh,* 976 F.2d 763, 767 (1st Circuit 1992)].

3.1.2 Cumulative Effects

In accordance with NEPA and the Council on Environmental Quality (CEQ) guidelines, cumulative effects are to be analyzed as a component of any project undergoing a NEPA analysis. Cumulative effects are incremental effects as a result of implementing an action and consist of any past, present, and reasonably foreseeable future actions on any lands regardless of the agency or person undertaking the action, to include Federal, State, and private. Cumulative effects can be individually minor but collectively significant over a period of time (40 CFR 1508.7). An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other actions, the effects may be significant. The time and spatial area for the analysis of cumulative effects is resource dependent.

Cumulative effects were assessed for this project in terms of how the alternatives would add to the past, present, and reasonably foreseeable future activities (Appendix E – Activities Considered for Cumulative Effects). Existing conditions described under each resource section reflect the cumulative effects of past and present activities that have occurred in this area. Each resource section identifies specific past, present, and reasonably foreseeable future actions listed in Appendix B with a discernible effect on a particular resource as reflected in the existing condition.

3.2 Forest Vegetation

3.2.1 Analysis Area

This analysis will only discuss the effects of the proposed action on early seral species based on cover type. Much of the existing condition and analysis information is provided in the FEIS and is not reiterated here. Specific information found in the FEIS and not included here are related to: the biophysical environment, VRUs, old growth, burn severity, vegetative agents of change, size class and desired future conditions. This information can be found in the Vegetation Section of the FEIS.

The direct and indirect effects to cover type are assessed at 26,788 acres project area scale. Cumulative effects were described using past harvest acres and are assessed at a larger 393,960 acre scale that includes the lower Selway River from the wilderness boundary to the mouth of the river and the Middle Fork Clearwater River. Any scale larger than this would dilute the effects of the project to immeasurable levels.

3.2.2 Regulatory Framework

3.2.2.1 Nez Perce National Forest Plan

- Timber Standard 1: Require silvicultural examination and prescriptions before any vegetative manipulation takes place on forested lands. Final determination of the silvicultural system for areas to be harvested would be made by a certified silviculturist after an on-the-ground, site-specific analysis.

  Compliance: All proposed treatment stands would have been examined on the ground by a silviculturist, wildlife biologist, and fuels specialist. All vegetative treatments would have silvicultural prescriptions approved by a certified silviculturist prior to treatment implementation. Prescriptions would consider site-specific factors as well as multiple resource objectives, NEPA decisions, other regulatory requirements and Forest Plan goals, objectives, and standards. Action alternative treatments were proposed because they balance the management, operational, soil disturbance, and human dimension requirements and respond to the purpose and need.

- Timber Standard 2: Clear-cutting would not occur adjacent to previously harvested areas that are still considered openings.

  Compliance: No harvest is being proposed adjacent to stands that would be considered an opening. All proposed harvest units that are adjacent to previously harvested stands are certified as fully stocked, and the trees are greater than 10 feet in height.

- Timber Standard 3: Permit timber harvest on lands classified as “unsuitable” for timber management to accomplish multiple use objectives.

  Compliance: No harvest is being proposed on unsuitable lands.

- Protection Standard 3: Minimize the impacts of the mountain pine beetle and other insect and disease infestations to the extent necessary to achieve the overall goals and objectives of this Forest Plan.

  Compliance: Loss of the long-lived early seral components in the ecosystem is a major factor in the lack of ecological resiliency. Salvage and planting treatments would remove dead timber and high fuel volumes, which would trend the project area toward species compositions with increased resilience. Proposed treatments would promote Forest resistance to disturbance agents while promoting Forest resiliency.

3.2.2.2 National Forest Management Act

Vegetation Manipulation (36 CFR 219.27(b)[1]): Ensure that technology and knowledge exist to adequately restock lands within 5 years after final harvest.

Compliance: Restocking within 5 years of regeneration harvest is a required design item of the action alternatives. Technology and knowledge do exist to comply with this requirement. This standard is met under the action alternatives.

Silvicultural Practices (36 CFR 219.27(c): No timber harvest, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suitable for timber production.

Compliance: Guidelines for determining suitability are found in the FSH (2409.13). The proposed harvest units are within the productive habitat types as described in Cooper, Neiman and Roberts, 1991. None of the areas being proposed for treatment as part of the project are designated as unsuitable under the 1987 Forest Plan (USDA Forest Service 1987b). This standard is met under the action alternatives.

Salvage Operations (36 CFR 219.11(4) iii: The planned maximum size for openings to be cut in one harvest operation shall not apply to the size of openings harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm (16 U.S.C. 1604(g)(3)(F)(iv)).

Compliance: The proposed fire salvage is within the area impacted by the 2014 Johnson Bar Fire.

Compliance: Guidelines for determining suitability are found in the FSH (2409.13). The proposed harvest units are within the productive habitat types as described in Cooper, Neiman and Roberts, 1991. None of the areas being proposed for treatment as part of the project are designated as unsuitable under the 1987 Forest Plan (USDA Forest Service 1987b). This standard is met under the action alternatives.

3.2.2.3 Forest Service Manual 2411.02 – Objective

To provide, to the extent possible, a supply of timber to maintain a stable community or communities designated by existing cooperative or Federal sustained-yield units agreement or policy statements (16 USC Sec. 583).

3.2.2.4 Forest Service Manual 2471 – Harvest Cutting

The size of harvest openings created by even-aged silvicultural systems in the Northern Region would normally be 40 acres or less. Creation of larger openings would require 60 day public review and Regional Forester approval.

Compliance: The public was informed during scoping that regeneration openings in excess of 40 acres were proposed for the project area. Approval to exceed the 40-acre opening size, with appropriate interdisciplinary analysis and documentation, was received from the Regional Forester‘s office on October 24, 2014. The action alternatives would create openings on the landscape that are closer in scale and pattern to the openings developed under historic disturbance regimes for this area. This standard is met under all the action alternatives.

3.2.3 Analysis Methodology

The analysis of effects on forest vegetation resources is based on the following information:

- Best Available Science
- Review of pertinent scientific literature related to the ecology, fire, insects, disease, reforestation
- Review of pertinent silvicultural practices for managing timber
- Geographical Information Systems data available from Nez Perce-Clearwater National Forest databases
- Collective and professional knowledge of the project area by the Interdisciplinary Team regarding proposed silvicultural practices and the patterns and processes of forest vegetation within the project area
- Review of Forest Plan for timber resources
- Review of applicable law and regulations
- Data from GIS R-1 V-Map
- Modeling using the Forest Vegetation Simulator

Modeling with Forest Vegetation Simulator (FVS) would be used to compare success of planted early seral species to natural regeneration. The FVS model tends to overestimate volume in small trees and underestimate volume in in large trees. The underestimation of volume increases as elevation increases. The FVS model was used to model planted and natural stands of timber using field data known as stand exams. Stands were grown with pre-commercial thinning treatments at age fifteen. Pre-commercial thinning favored early seral species. The FVS model was used to determine approximate stand composition and trends in stand development.

Pertinent scientific research, best management practices and collective professional knowledge of proposed silvicultural practices was used to determine project operations. Habitat types indicate the productivity of the land and are determined by the group of plants growing on the site. Data was analyzed in reference to Cooper, Neilman, and Roberts, 1991 habitat types to determine Forest productivity and reforestation needs. Reforestation needs were determined by on the ground observations and field data known as stand exams. The tree species growing on the land is referred to as cover type and may change with disturbance agent interactions and plant succession over time within the capability of the habitat type.

Vegetation response units (VRU) were used to describe the biophysical environment and to provide appropriate context for analyzing Johnson Bar Fire Salvage conditions. Agents of change—such as succession, weather, climate, fire, insects, and disease—must also be considered in these discussions.

Trees are managed in units of stands. A stand is defined as a contiguous group of trees sufficiently uniform in species composition, structure, site history, topographic location and condition (Tappeiner, et. al., 2007).

Current vegetative conditions were summarized using walk thru stand exams, post fire assessments, BARC imagery, Forest Service GIS databases from R-1 V-Map, FACTS, and FSVeg. R-1 Vmap was used to determine current cover type. R-1 Vmap accuracy is 78 percent. The inventory model also uses the Forest Vegetation Simulator (FVS) to grow the stands to 2104 conditions, starting from the time when the stands last received a stand examination.

The FVS model provided a variety of information that was used in the analysis, including species composition, growth over time, and fire and fuels parameters. Documentation of these FVS attributes is found in Dixon, 2008.

Field observations by a certified silviculturist were used to determine reforestation needs and verified appropriate silviculture prescriptions. Field observations, plot sampling and analysis was done to verify old growth mortality and to develop a reforestation plan.

3.2.4 Resource Indicators

No single indicator is a definitive measure of Forest health, but early seral species are an indicator of Forest resilience (Schantz, 2015). The early seral cover type is the analysis indicator that would be discussed in the existing conditions at the project level scale (Table 5). This analysis relies on the comparison of existing conditions dominated by western red cedar and grand fir to the percent of early seral species. Stand conditions were compared under the no action alternative and the three action alternatives over 85 years (2104). Early seral species would be restored by planting western white pine and potentially some Douglas fir.

Current conditions for cover type indicators were derived from R-1 V-Map.

A forest objective is to increase early seral species on the landscape. Therefore, the project level scale was used to analyze the cover type of early seral species by alternative:

- Percent of the project area with forest cover type dominated by the long-lived early seral species (western white pine, western larch, and ponderosa pine) as compared to the percent of the area dominated by grand fir, western red cedar, and Douglas-fir.

3.2.5 Affected Environment

3.2.5.1 Forest Composition

Forest cover types describe the dominant tree species present in a stand. The forest cover types in the project area are primarily late successional mixed conifers (Table 5). The uplands and the breaklands have relic, long-lived early seral species (western larch and ponderosa pine), but are primarily composed of late-seral, shade-tolerant species. The presence of long-lived early seral components can be used as an indicator of forest health (Schantz, 2015). Early seral species and their composition, structure, and functions have the desired resistance, and resilience to recover from disturbances. Resistance is defined as the ability for a stand to prevent negative impacts from disturbance agents and protect valued resources. Resilience is defined as the capacity of ecosystem to return to desired conditions after disturbance.

Early seral species require adequate amounts of sun for growth. The growth of dense tall shrubs across the burned area limiting light to the ground and making natural regeneration difficult.

Table 5. Cover types in the Johnson Bar project area.

Species	Existing Percent of Cover Type[a] within Project Area	Desired Future Condition Range (Goal)
HERB[b]	0%	10%
SHRUB[b]	25%	8-15%
Bare Ground	1%	0%
Ponderosa Pine	0%	15-30%
Douglas-fir	2%	15-30%
Cedar/ Grand Fir	17%	9-17%
White Pine	1%	0-5%
Shade Intolerant MIX	15%	25-50%
Shade Tolerant MIX	39%	10-30%
Total	100%	
Total Percent of Early Seral Species (PP/WP/L)	16%	

[a] Cover Type determined by R-1 V Map Dominance 60. Dominance 60 indicates that 60 percent of the stand is the species indicated.
[b] Temporary forage is herb and shrub stage in addition to individual shrub and herbaceous stage that will revert into a cover type.

Desired Future Conditions

Stands are desired to be resistant to strong winds, fire, insects and disease. Trees should be vigorously growing as indicated by long leader growth, deep green needle color, long needle length, full crowns and the color of bark (Sherlock, 2007)(Keen, 1940). Early seral species are desired because they are more resistant to root rots (USDA, 2008). Stand densities are desired to be stocked to fully stocked. Reaching these goals may take time due to the fire severity and the time it takes for trees to grow to reach desired conditions.

In un-stocked area should be planted with up to 400 seedlings per acre of early seral species. In each of the prescriptions, all live trees would remain after the harvesting operations as leave trees or reserve trees. 14-28 live or dead leave trees per acre with diameters greater than 14 inches in the overstory. Five snags greater than 20 inches in diameter within units; of which three snags should be greater than 30 inches in diameter. 17-33 tons of fuel on the ground to provide wildlife habitat and to develop productive soils (Design Features and Figure 4).

Figure 4. Desired future condition displaying species diversity that includes white pine, western larch, ponderosa pine, Douglas-fir, and grand fir. The age class is diversity is that there are young saplings and the reserve trees present. Project design criteria will leave snags and coarse woody debris

Old Growth

Old growth stands on the Nez Perce National Forest are managed by prescription watersheds referenced as Old Growth Analysis Areas (OGAA). Old growth is discussed in terms of OGAAs which extend beyond the project area (51,900 acres).

Old growth after project completion would be 855 acres of verified old growth, 4,707 acres of recruitment old growth totaling 5562 acres of old growth. Eleven percent of the old growth analysis area is old growth. For more information refer to the FEIS.

3.2.6 Direct and Indirect Effects

3.2.6.1 Alternative 1- No Action

Stand Development and Dynamics

Alternative 1 would allow natural processes to continue because no treatments would be conducted. The Forest would continue to be altered by natural events such as succession, insect, disease, and wildfire. Some mixed-conifer habitats would mature and develop old-growth habitat characteristics, including multiple canopies, snags, and large downed wood. This alternative would allow for burned areas to regenerate primarily with shade tolerant late seral species (Cooper, Nielman and Roberts, 1991) which are more susceptible to natural disturbance agents like; insects, disease, wildfire, root rot and wind events (Smith and Fischer, 1997). Early seral species would have difficulty regenerating as a result of the current growth of dense shrubs in the burned areas. There is currently a lack of early seral species that could act as a seed source for regeneration.

The Johnson Bar Fire created 6,316 acres of the stand initiation structural stage. Canopy cover was lost in varying amounts and has allowed the establishment of shrub species such as thimbleberry, to reduce the chance of naturally regenerating seral species.

The no action alternative would;

1. Not meet desired future conditions of promoting early seral species.

2. Promote future severe fires through increased fuels that could convert portions of the forest to shrub fields like the Pete King Fire and The Slims Fire in Meadow Creek Roadless Area. (Coppaletta, Merriam, and Collins, 2015; Smith and Fischer, 1997; USDA, 1981).

3. Not comply with the Section 5 (16 U.S.C. 583 (b) of the National Forest Management Act requirements to manage the Forest at a high rate of productivity in perpetuity (MUSYA, 1960).

4. Leave the forest with less resilience to the agents of change like root rot, wildfire, and drought.

3.2.6.2 Alternatives 2, 3, and 4

Alternatives 2, 3, and 4 would not change the amount of ponderosa pine, Douglas-fir, or cedar (Table 6). Alternative 3 would reduce grand fir by 1%, while alternatives 2 and 4 would maintain grand fir at current levels. Alternatives 2, 3 and 4 would increase the western white pine by 8%, 7% and 5%, respectively. Alternatives 2 would reduce the shade intolerant mix by 1%. Alternatives 2, 3 and 4 would reduce shade tolerant mix by 6%, 5% and 4%, respectively. Alternatives 2, 3, and 4 would increase shade intolerant species in total by 8%, 6% and 4%, respectively. The conversion of treated acres to early seral species would make those areas more resistant to wildfire, strong winds, drought and root rots and more resilient to the agents of change.

Table 6. Comparison of alternatives showing cover type cumulative effects with fire restoration planting as determined by R-1 V-Map Dom 60

Species	No Action	Alternative 2	Alternative 3	Alternative 4
	Percent of Cover Type Project Area	Percent of Cover Type Project Area	Percent of Cover Type Project Area	Percent of Cover Type Project Area
HERB	0%	0%	0%	0%
SHRUB	1%	1%	1%	1%
Bare Ground	24%	24%	24%	24%
Ponderosa Pine	0%	0%	0%	0%
Douglas-fir	2%	2%	2%	2%
Grand Fir	12%	11%	11%	12%
White Pine	1%	9%	8%	6%
Cedar	5%	5%	5%	5%
Shade Intolerant MIX	15%	14%	15%	15%
Shade Tolerant MIX	38%	32%	33%	34%
Total	100%	100%	100%	100%
Percent of Early Seral Species	**16%**	**24%**	**23%**	**20%**

Harvesting operations would disturb the duff layer, which would create areas that would result in improved sites for seedling establishment (Tappeiner et. al., 2007). Slash would act like mulch and maintain soil moisture for improved tree growth. Planting early seral seedlings would shorten the period of forest establishment and provide for improved survival when compared to naturally regenerated stands. The larger stem size and larger root systems of the planted seedlings provides a competitive advantage over natural seedlings (Hobbs et. al., 1992). This edge allows faster growth rates and better success in competing with shrub and big game browse.

Stands with a higher proportion of white pine, western larch, and ponderosa pine would be more resistant to fires, strong wind, and root rot than natural stands regenerating as western red cedar and grand fir. Grand fir is highly susceptible to root rot (Hagle, Tucker, and Anderson, 2011; USDA, 2004). The resistance to root rot would inherently improve resistance to strong winds. Mature western larch and ponderosa pine are the most fire resistant species and mature western white pine has an intermediate resistance to fire (USDA, 1990).

Succession has naturally promoted shade tolerant species and decreased early seral species on the landscape. Surviving western red cedar, and grand fir trees would naturally regenerate. Planting western larch and western white pine would ensure the presence of early seral species, increase species diversity, and move the landscape composition closer to desired conditions.

Benefits of implementing Alternatives 2, 3 or 4 include:

1. Western white pine restoration;

2. The sustaining of early seral trees species that are resistant to fire, and root rot (USDA, 2008);
3. Increase tree species diversity; and
4. Greater regeneration success rate (Newton et. al., 2006).

3.2.7 Cumulative Effects

The cumulative effects area is the old growth analysis units; the following projects, are listed in the cumulative effects assessment as they would contribute to the establishment of the early seral species component.

- Idaho Department of Lands would plant 167 acres, and private landowners are expected to plant 200 acres of early seral species as a result of fire salvage on their lands (2014 Johnson Bar fire).

The following projects are outside the vegetation cumulative effects of the Johnson Bar Fire Salvage Project, but contribute to the watershed restoration analysis by indicating the establishment of vegetation and the establishment of the early seral species.

- Lowell WUI would harvest trees to provide for community protection and would plant about 227 acres of early seral species after harvest.

- The Forest would plant about 540 acres of early seral species as a result of the 2015 Woodrat Fire Salvage project.

The following projects are outside the analysis area, but would contribute towards the overall resiliency of the Middle Fork and Selway River basins by indicating the establishment of vegetation and the establishment of the early seral species:

- Idaho Department of Lands would also plant 2,620 acres of early seral species in the Middle Fork Clearwater River drainage as a result of the 2015 Woodrat Fire.
- The Wash and Slide Fires of 2015 burned about 46,000 acres in 2015. Approximately 4,700 of the Wash Fire acres outside of roadless designated areas may be planted in 2017 and 2018.

3.2.7.1 Alternative 1

The timing of the reforestation cycle has been delayed and has stalled restoration work in the project area since the 2014 fire. Thimbleberry and other shrub species will continue to increase competition in the fire area making successful seral species regeneration less likely (Newton et. al., 2006). The nutrients normally available to seedlings after a fire will have been absorbed by competing shrub species or leached out of the soil (Tappeiner et. al., 2007). Delaying the reforestation timing sequence has negative effects and leads to reforestation failures when trying to establish early seral species.

This alternative may increase the early seral species component of the analysis area by 1 % if the State and private land owners plant early seral species.

The no action alternative would allow a majority of the project area to be dominated by grand fir, western red cedar, and Douglas-fir, instead of more resilient white pine, ponderosa pine and larch.

Currently there are safety cautions when entering the project area due to falling fire killed trees, particularly cedar (refer to Johnson Bar Fire Salvage Job Hazard Analysis). This has and will continue to develop large fuel accumulations, and place the project area at risk to severe re-burn and public safety. The falling trees will continue to be a safety hazard to the public.

3.2.7.2 Alternatives 2, 3, and 4

When considered along with private, State and other fire restoration planting in the area, the action alternatives would add to the resiliency of the area. The cumulative effect of past, present and future reforestation efforts promote forests which are more resistant to bark beetles and disease. In the long term, early seral species resiliency traits are more likely to adapt to climate change. Early seral species provide better opportunities for old growth stand to develop over the landscape due to their greater resistance, and resilience to fire, drought, wind and root rot.

Through planting, treatment areas previously dominated by Douglas-fir, grand fir and western redcedar before the fire would become a more species diverse stand. Planting would increase early seral species like western white pine on the landscape and move the Forest towards desired conditions.

Alternatives 2, 3 and 4, would increase early seral species by 8%, 7% and 4%, respectively, of the project area. The early seral species component would improve another 1% in each alternative if the State of Idaho and private land owners plant early seral species.

Forest management provides the best opportunity for the burned areas to recover from the fire. Failure to plant early seral species would allow burned areas to be converted to shrub fields or a closed canopy multi-storied grand fir stands that are susceptible to fire.

The Wash Fire of 2015 burned about 12 acres within the analysis area; however, it was a low intensity burn that did not alter the vegetative component. The Slide Fire of 2015 burned through some shrub fields outside the project area, but inside the OGAA. The shrub fields will likely regrow and facilitate wildlife forage.

The range allotment Near Tahoe Creek would have minor effects. Cattle graze on seedlings reducing the stocking of tree species. The seed crops of the grand fir generally overcome the grazing on trees. Unstocked areas caused by cattle mortality are replaced by grand fir, which increases the late seral cover type.

There was 80 acre of timber harvest on private lands near the mouth of the Selway River and another 120 acres sale on the Selway River face near Elk City Creek. The Idaho Forest Practices act requires regeneration of these harvest areas. The planted trees will accelerate Forest recovery of the project area and the tree roots will help stabilize the soil in the long term. The area has prolific coverage of fireweed and other shrubs and forbs. Many snags were left across the landscape and live and dead trees were left in the riparian areas.

The State of Idaho harvested 167 acres south of Swiftwater Creek. The Idaho Forest Practices Act requires regeneration of these harvest areas. The planted trees will accelerate Forest recovery of the project area and the tree roots will help stabilize the soil in the long term. The area has prolific coverage of fireweed and other forbs. Streams were buffered and many snags were left across the landscape. Cull material functions as coarse woody debris and the dense vegetation prevents erosion from occurring.

Wild and Scenic Rivers: The Johnson Bar Fire of 2014 and Wash and Slide fires of 2015 burned portions of the Selway River and reset the successional stage. Nyland (2002) and Oliver and Larson (1996) state that following a major disturbance (i.e. stand replacing event), the successional stage of a stand reverts to a “stand initiation” or non-old growth stage (Nyland, 2002; Oliver and Larson, 1996). In all cover types, stands burned at high severities have returned to the stand initiation stage. This has led to a diversity in the vegetation within the viewing area of the wild and scenic river corridor. Proposed harvest within the viewing area would protect and enhance the Vegetation ORV by reducing fuels and increasing the resilience of the forest to fire and insects and disease by planting early seral species. Harvest is also consistent with the River Plan by providing for public safety. The presence of large stands of snags constitutes a safety hazard along roads and within stands.

State and private reforestation efforts within the corridor has provided 2-4 more years competitive advantage over natural seedlings (Hobbs et. al., 1992), which will shorten the fire recovery period. Forest Service reforestation efforts would reduce the fire recovery period as well and enhance wild and scenic rivers outstanding and remarkable values, by restoring tree cover quickly. This would protect and enhance ORVs by providing quick revegetation of the area. The retention of snags and unharvested areas would promote visual diversity. Removing excess dead trees would allow big game wildlife access and possible viewing from the corridor.

In 2016, the understory is dominated by fireweed and thimbleberry. Maidenhair fern, lady fern and other ferns will develop as shade conditions develop which remove thimbleberry and other competing vegetative species. Forest conditions developing from restored western white pine and western red cedar would eventually restore conditions needed for fern species.

3.3 Soils

3.3.1 Analysis Area

Regional soil standards are based on the premise that productivity is site specific and effects should not be analyzed at a watershed scale (Page-Dumroese et al. 2006). Given the premise that soil productivity is site specific, protocols outlined in the Region 1 Approach to Soils NEPA Analysis (USDA 2011) require an evaluation of predicted Detrimental Soil Disturbance (DSD) for specific activity areas; in this case an activity area equals a harvest unit. The areas assessed for soils concerns are the individual treatment units (variable acres) and associated skid trails, landings, and temporary roads within the project area.

3.3.2 Regulatory Framework

Forest Plan direction and the following Federal and State laws and regulations pertaining to the management of soil resources would be applied to the project:

- FSM 2500 Watershed and Air Management – Washington Office (WO) Amendments 2500-2010-1 and 2500-2010-2 and Northern Region (R1) Supplement 2500-14-1 (Regional Soil Quality Standards)
- Soil and Water Conservation Practices (SWCPs) Handbook - FSH 2509.22
- Idaho Forestry Best Management Practices (BMPs)
- Idaho Forest Practices Act (1974)
- National Forest Management Act of 1976 (NFMA) 16 USC 1604(g)(3)(i)
- 36 CFR 219.20

3.3.2.1 Consistency with Nez Perce National Forest Plan and Environmental Law

The Johnson Bar Fire Salvage project was designed to meet the standards set forth in the Idaho Forest Practices Act, FSM 2500 - Watershed and Air Management and Northern Region (R1) Supplement 2500-14-1 (Regional Soil Quality Standards), and FSH of Soil and Water Conservation Practices (FSH 2509.22).

The proposed project complies with 36 CFR 219.20, which requires conservation and protection of soil and water resources and NFMA 16 USC 1604(g)(3)(E)(i), which states “Soil, slope or other watershed conditions would not be irreversibly damaged.”

Region 1 Soil Quality Standards found in FSM 2500 Supplement 2500-14-1 (USDA 2014) specify that at least 85% of an activity area (defined as a land area affected by a management activity) have soil that is in satisfactory condition. In other words, detrimental effects (including past management effects) shall be less than 15% of an activity area. In areas where less than 15% detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 15%.

Nez Perce National Forest Plan standards listed on page II-22 of the Forest Plan would also be met (Table 7).

Table 7. Forest Plan compliance

Standard Number	Subject Summary	Compliance Achieved By
1	Evaluate the potential for soil displacement, compaction, puddling, mass wasting, and surface soil erosion from ground-disturbing activities.	• Landtype identification and evaluation. • Field surveys or office evaluations were conducted on each of the proposed Activity Areas (units) for Regional standards.
2	A minimum of 80% of an Activity Area shall not be detrimentally compacted, displaced, or puddled upon completion of activities.	• Post-project monitoring to verify compliance and to assess if additional mitigation is needed. • Soil improvement activities on areas with prior effects to achieve a net improvement in soil productivity.
3	Maintain sufficient ground cover to minimize rill erosion and sloughing on road cut and fill slopes and sheet erosion on other Activity Areas.	• Project design criteria were developed to minimize erosion. • Temporary road locations were evaluated. Unit-specific design criteria were developed for high subsurface erosion areas.

3.3.3 Analysis Methodology

GIS generated reports and maps, aerial photos, and field reviews were used to analyze effects to the post-fire soil resource from the project's proposed activities. Field sampled vegetation database (FSVeg) queries were conducted to identify past harvest activities and their time frames (see project file). Post-fire field data was collected during the BAER assessment for the Johnson Bar fire and by the Forest Soil Scientist during 2014 and 2015. Additional field visits were completed in 2016 to assess proposed project impacts and recovery from the 2014 wildfire. Information collected includes burn severity, soil texture, landslide prone, and hydrophobicity. After this initial field review, existing DSD was determined using LIDAR imagery in accordance with the Region 1 Approach to Soils NEPA analysis (UDSA 2011).

An erosion hazard assessment was used to summarize erosional characteristics based on landtype properties. This assessment described overall erosion hazards in the project area and at the unit scale to aid in the development of project design criteria.

Potential soil restoration opportunities throughout the project area were assessed, with a focus on old skid trails, landings, and roads. Project design criteria describe methods for minimizing effects to the soil and techniques for restoring soil biophysical integrity.

3.3.3.1 Data Assumption and Limitations

The methodology outlined in the Region 1 Approach to Soils NEPA Analysis Regarding Detrimental Soil Disturbance in Forested Areas (USDA 2011) and the Forest Soil Disturbance Protocol (USDA Forest Service 2009b) provides a conservative assessment of existing soil conditions (Page-Dumroese et al. 2006a), given its inherent assumptions (ocular data and soil pits).

Informal comparisons found that both for single observers and between observers, category calls in this methodology have a variability of 5%. This level of survey leads to a 90%–95% confidence with error bars from 5% to 8%, depending on the amount of disturbance found. The surveys achieve statistical inference for units with either low disturbance (<7%) or moderately high disturbance (>23%) (Page-Dumroese et al. 2009).

Field soil survey methodology based on visual observations can produce variable results among observers, and the confidence of results is dependent on the number of observations made in an area (Page-Dumroese et al. 2006a). The existing and estimated values for DSD are not absolute and are best used to describe the existing soil condition. The calculation of the percentage of additional DSD from a given activity is an estimate, since DSD is a combination of such factors as existing ground cover, soil texture, timing of operations, equipment used, skill of the equipment operator, the amount of wood to be removed, and sale administration. The DSD estimates for proposed project activities are based on Nez Perce-Clearwater National Forest monitoring compiled, in part, in Archer 2008, and further refined to respond to current research and professional judgment of Forest Soil Scientists (Archer 2008; Reeves et al. 2011). The DSD estimates of proposed activities also assume that BMPs would be implemented and that soil recovery occurs over time.

3.3.3.2 Scientific Uncertainty and Controversy

Site and soil productivity relies on complex chemical, physical, and climatic factors that interact within a biological framework. For any given site and soil, a change in a key soil variable (e.g., bulk density, soil loss, and nutrient availability) can lead to changes in potential soil productivity. Defining the threshold at which productivity is detrimentally disturbed is controversial. The rationale for the 15% limit of change in soil bulk density was largely based on the collective judgment of soil researchers, academics, and field practitioners, and the accepted inability to detect changes in productivity less than 15% using current monitoring methods (Powers 1990). Powers (1990) states that the soil quality guidelines are set to detect a decline in potential productivity of at least 15%. This statement does not mean that the Forest Service tolerates productivity declines at this level, but that it recognizes problems with detection limits.

Soil quality standards are being studied by a cooperative research project called the North American Long-Term Soil Productivity Study (LTSP). The 5- and 10-year results were recently published (Page-Dumroese et al. 2006b; Fleming et al. 2006; Sanchez et al. 2006). The LTSP study is ongoing and provides the best available science to resource professionals. In a 10-year study, no observed reduction in tree growth occurred as a result of compaction or organic matter removal in plots with soils generally similar to those found in the project area (silt loam) (Powers et al. 2005). These results are relatively short-term and involve many site- and soil-specific factors. Future results from the ongoing study should be helpful for assessing harvest practices on soil productivity.

Additional controversy surrounds the use of the term “irreversible” in the NFMA. The NFMA has guidelines that “ensure that timber would be harvested from NFS lands only where soil, slope, or other watershed conditions would not be irreversibly damaged.” The DSD described in this analysis does not necessarily result in substantial and permanent impairment.

DSD is reversible if the processes (organic matter accumulation, moisture, topsoil retention, and soil biota) are in place and if time is allowed for recovery. Of particular concern are the ash cap soils, soils derived from the ash deposited after the eruption of Mount Mazama over 7,000 years ago (NPCNF 2014; McDaniel et al. 2007). These ash cap soils are both rich in nutrients and excellent for retaining soil moisture even in drought conditions. Though highly productive, ash derived soils do have extra sensitivities to management activities. In undisturbed areas, the soils are resistant to erosion; but if disturbed, ash derived soils have a high risk of surface erosion and are highly susceptible to compaction (Page-Dumroese et al. 2007). Given the unique conditions under which the ash cap soils are formed, irreversible damage to soils in the project area could result from the loss of these volcanic soils through erosion or removal by excavation for temporary roads and/or skid trails. Soil recovery could still occur in remaining subsurface soils, yet the exceptionally high porosity and water-holding properties of the Mazama ash cap would likely be irrecoverable.

3.3.4 Resource Indicators

3.3.4.1 Soil Stability and Erosion Hazard Potential

Soil erosion can result in a loss of soil productivity due to surface soils moving downslope and thus removing the materials with the greatest ability to hold moisture and nutrients. Compared to the subsurface soils, surface soils in the project area contain more organic matter and have a higher volcanic ash-derived mineral content. Ash cap soils are highly resistant to erosion when undisturbed; however, after fire disturbances and removal of the litter and duff layers this layer becomes highly erosive (Robichaud et al. 2007). Removal of vegetation and/or ground disturbance associated with timber harvest or fire can increase erosion on certain landtypes.

Soil stability can also refer to mass erosion events as a result of landslides. For the purposes of this document the following terms are considered synonymous: mass failure, mass wasting, landslide, and mass erosion. The mass erosion-related terms refer to erosion that happens in an episodic event, as opposed to more chronic surface erosion. Proposed harvest units on areas considered prone to landslides were reviewed in field and if the soil scientist confirmed landslide indicators, these areas were removed from the harvest activities. As landslide prone areas were removed or buffered out of proposed harvest units, acres of landslide prone terrain is not an Indicator. Note: there are existing roads in the project area on landslide prone terrain. Forest and Regional soil quality standards do not apply to roads; therefore, roads and landslides are analyzed in detail in the Hydrologist’s report.

Indicator: Acres of proposed salvage harvest on landtypes with high surface erosion hazard.

Indicator: Miles of proposed temporary roads and swing trails on landtypes with high subsurface erosion hazard.

3.3.4.2 Soil Productivity

Past management activities and the fire burn severity in the project area have caused Detrimental Soil Disturbance (DSD) and affected soil productivity. According to the Region 1 Soil Quality Standards, detrimental disturbance (e.g., compaction, displacement, erosion, loss of organic matter) from management activities should not exceed 15% of an Activity Area and coarse woody material retention should be appropriate to the habitat type.

Indicator: Total acres of new detrimental soils disturbance.

Indicator: Number of commercial harvest units requiring specialized project design criteria to meet Regional soil standards.

Table 8. Summary of resource indicators by alternative

Resource Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Acres of harvest on terrain rated as high hazard for surface erosion	0	117 (5%)	93 (5%)	36 (3%)
Miles of temporary road or swing trail construction on soil rated as high hazard for subsurface erosion	0	2.0	0.2	2.0
Total acres of new DSD	0	82	60	39
Number of harvest units requiring specialized project design criteria to meet Regional soil standards	0	0	0	0

3.3.5 Affected Environment

3.3.5.1 Landforms and Geology

Soil characteristics in the project area vary according to slope gradient, slope aspect, parent material, texture, depth, vegetative cover, and microclimate. Landforms in the project area are mostly dissected stream and mountain breaklands (70%), low- and moderate-relief rolling uplands (11%), and landslide deposits (11%). Breaklands consist of steep slopes and drainage ways adjacent to rivers and their tributaries. They have straight concave slopes with gradients of 60% or more. The slopes are overly steep as a result of streams down cutting faster than the adjoining slopes could retreat. Bedrock is moderately to weakly weathered. Rock outcrop is common. Soils are colluvial and weakly developed and vary widely in properties. Soils on northerly aspects tend to be deep and skeletal with a mixed ash cap. These lands are the most unstable on the Forests. Breaklands deliver sediment to streams very efficiently because of steep slopes and closely spaced drainage ways. The point where drainage ways converge at the lower apex of the landforms tends to accumulate sediment. This convergence may be a source of debris avalanches and flash floods.

The geologic substrate is primarily Belt Zone and Border Zone metamorphics (95%), followed by Alluvial deposits (3%), Idaho Batholith Border Zone granitics (1%) and Columbia River basalt (1%). Soil parent material is primarily granitic (84%), with colluvium of various types (11%) and basalt (2%). A variety of metamorphic rocks are associated with the Idaho Batholith consisting mostly of the Belt Supergroup rocks of Precambrian Age (more than 600 million years old). The rocks are dominantly schist, gneiss, siltite, argillite, and quartzite that are located near the margins of the granitics and probably represent the metamorphism associated with the intrusions. The Belt Supergroup rocks are laid down in a seabed and subsequently metamorphosed. Surface soils are generally silty or sandy loams. The coarse fragment content in the soils is very low, generally less than 35%, increasing the susceptibility of the soil to compaction and rutting from ground-based machine harvesting. Rock fragment content and hardness depend upon the degree of the rock’s chemical weathering. Parent materials derived from metasedimentary rocks are divided into two groups according to the amount and hardness of rock fragments. These properties affect the erodibility of soils formed in these parent materials. Weakly weathered metasedimentary rocks have subsoils and substrata resistant to erosion and can be identified by containing many angular rock fragments. Micaceous schist soils tend to have weak subsoil clay accumulations and are resistant to erosion; however, these soils are prone to mass wasting. Well weathered quartzite geologies have very highly erodible subsoils and substrata.

Much of the area is overlain by a mixed to intact layer of Mazama volcanic ash, ranging from 8 to 12 inches in thickness. The ash cap is thin or missing in the steeper breaklands (0 to 6 inches). Soil surface layers formed in ash and loess are an excellent medium for plant growth. Ash material is physically highly favorable to root growth, being very permeable and possessing a high ability to hold moisture and nutrients. Soils with the thickest loess surface layers tend to be the most productive. Its presence as an intact layer with little mixing is an indication of relatively stable slopes over the past 6,700 years since the ash deposition. Most soil surface layers are formed from volcanic ash or loess mixed with subsoil material; lower soil layers are formed from materials derived from other sources. An ash influenced surface layer is resistant to erosion when undisturbed; but if disturbed, it has a high risk of surface erosion. These soils are also highly susceptible to compaction.

3.3.5.2 Landslide and Erosion Hazard Potential

Landtypes are ecological land units categorized by similarities in soils, landforms, climate, geologic substrate, geomorphic processes, and plant associations (Cleland et al. 1997). These land units have been mapped for the entire Nez Perce National Forest (USDA NRCS 2006). The characteristics used to classify landtype listed above are also the key landscape characteristics that typically determine whether a site will have a higher potential for erosion and landslides. Landtypes are used in the project area to help focus field evaluations and to pinpoint any erosion hazard concerns. There are landtypes in the Project Area that are considered prone to landslides because of slope, climate, and geology.

Landslides are the dominant natural erosion process in the project area. Landslides are most likely to occur in areas where they have already occurred in the past, on roaded landscapes and in area of past wildfires. Past landslide events have helped the Forest identify five factors where landslides are most prevalent, these include the following: slope angle, geologic parent material, landform, aspect, and elevation. McClelland et al (1999) summarizes the origins of the landslides during the most recent Forest-wide landslide event, which occurred during the winter of 1995-1996 winter. Of the 860 landslides analyzed, 84% occurred on Border and Batholith geology with breakland and mass wasting landforms, 94% of slides initiated below 5,000’ elevation at below ridgelines and just above midslope points, and most slides occurred on slopes greater than 56% with south facing aspects. The five factors identify areas with high probability for landslides; however, some kind of event, for example an intense rain storm, must occur to create conditions where soil strength/stability and root tensile strength are overwhelmed resulting in slope failure (Casadei et al 2003 and Montgomery et al 2009).

In many cases, the landscape features surrounding a location where recent landslide catastrophes have occurred and provide evidence of past and ongoing landslide activity. Landsliding is part of the processes behind the evolution of the landscape. Landslides are triggered by earthquakes, major storms, volcanic activity, or other natural or human-induced activities that may cause the earth to move. Highly landslide-prone (LSP) areas mapped on the Nez Perce National Forest are located on slopes over 60% and landtypes 50EUU and 50CUU. LSP was further refined for the Johnson Bar Fire Salvage Project area based on a combination of LIDAR analysis and field verification. Field indicators of landslides include the following: steep (over 60%) concave slopes, hydrophytic vegetation (i.e. sedges, moist site ferns), slumps, draws, and basins, past landslide locations, and obvious soil movement areas (typically indicated by curved and/or buttressed tree boles, soil creep, tension cracks, etc.). Where indicators are present in proposed harvest units, the area is buffered/removed from the harvest unit. PACFISH requires one site potential tree height buffers on landslide prone areas within key watersheds and no harvest on field verified landslide prone areas.

Areas considered highly prone to landslides comprise approximately 27% of the project area. **All areas identified as LSP have been excluded from proposed activities.**

3.3.5.3 Soil Productivity

Soils in the project area are generally silt loams, formed from loess and overlain with a shallow to moderately deep volcanic ash layer. Past natural and management activities have affected the productivity of these soils.

Fire

The Johnson Bar fire is the most recent, large-scale disturbance in the project area, and effects from the fire are discussed throughout the existing condition, environmental consequences, and cumulative effects sections. This analysis uses post-fire burn severity to describe potential watershed effects of the Johnson Bar fire, and potential interactions with treatments in the Johnson Bar Fire Salvage Project area. Fire intensity and soil burn severity are often incorrectly used synonymously. Fire intensity relates to the above ground fire effects generally identified through visual observations of changes in the over story vegetation and ground fuels (type, amount, arrangement, and moisture content). Soil burn severity is the effect of fire at and below the ground surface, specifically how the fire changes the physical and chemical composition of the soils. While fire intensity is not necessarily an indicator for wildfire effects on soils, observed changes from pre- to post-fire vegetation are used as preliminary indicators to estimate soil burn severity as a function of watershed response. Fire severity that detrimentally effects soil conditions leads to further degradation of soil productivity and soil-hydrologic function.

Post-fire preliminary “High”, “Moderate”, and “Low” severity mapping for the Johnson Bar Fire was derived using Burned Area Reflectance Classification (BARC). The initial severity mapping was validated with aerial reconnaissance and on-the-ground surveys.

Soil conditions were evaluated for fire effects that result in hydrophobic (water repellent) soils, changes to litter and duff (vegetative ground cover and slope obstructions), destruction of fine and very fine roots in the surface horizon, changes or loss of soil structure, and susceptibility to erosion. Changes in vegetative ground cover as affected by the fire were noted and compared to pre-fire conditions. Field transect data collected included: thickness and strength of soil water repellency, ash depth and color changes to soil, size and amount of above ground residual vegetation (fire intensity), post-fire effective ground cover and hillslope obstructions based on consumption of coarse woody debris, organic litter cover, soil texture, structure, and gradient. These data provide estimates for fire residence time, depth of litter layer consumed, duration, and amount of radiant heat throughout the litter/duff layer, and ease of detachability of surface soil particles.

The final soil burn severity map was developed in GIS using the BARC and field data. This information became the baseline for predicting soil-hydrologic response of the sub watersheds, including the changes in erosion and sedimentation rates, stream flows, and estimates for vegetative response of the burned area.

While the burn severities shown in the final map are a good approximation of the fire effects, there are discrepancies. The area of the fire above Road 652 along the Selway River was shown as predominately low and unburned. These small face drainages have a much higher proportion of moderate severity than the final severity map reflects. Also the burn severity was based on fire conditions around the first of September.

Burn severity describes the effects of the fire on soil structure, infiltration, capacity, and biotic components, and is used to indicate runoff, soil erosion potential, and detrimental soil disturbance from the fire (USDA FS 2014). Burn severity is defined through differences in surface organics, duff cover, and characteristics of mineral soils (Debano et al, 1998):

- Low severity – low soil heating, litter scorch or consumption with duff largely intact, mineral soil is not changed.
- Moderate severity – litter consumption with moderately charred or consumed duff, no visible alteration of mineral soil surface.
- High severity – complete consumption of duff and mineral soil surface visibly reddish or orange color.

Information collected includes burn severity, soil texture, landslide prone, and hydrophobicity. Burn severity maps were created following the Johnson Bar fire. Table 9 describes the amount of past harvest areas, burn severity, and estimated DSD in the proposed units.

Field surveys in 2015 and 2016 show significant changes in soil burn severity classifications. During two growing seasons, the regrowth of vegetation, primarily grasses, forbs, and some shrubs have largely mitigated the effects of wildfire. There is no longer evidence of bare soils and no hydrophobicity is detected in severely burned areas. For the purposes of calculating DSD, the 2014 Johnson Bar soils assessment factored in burn severity contributing toward the detrimental soil productivity. In 2016, burn severity effects on potential soil productivity (measured by DSD) for moderate and high burn severity areas are retained; however, the level of effect for moderate and high burn severity is reduced to account for recovery. The changes in factors for severity calculations are as follows: where harvest activities area proposed on areas classified as moderate burn severity in 2014, the predicted increase in DSD is reduced from a 7% to 2% in each Unit and for high burn severity classification, predicted increases in DSD were reduced from 9% to a 4% in units. The changes in coefficients of disturbance are also detailed in the spreadsheet calculations for the 2016 report. Though the estimates of impacts to burned soils are still likely high given the soil and ground vegetation recovery that has occurred in the project area, most literature still considers past wildlife effects on soils for 5 years. Consequently, the increased DSD estimates allow for conservative estimates of the likely impact of salvage logging.

Existing DSD was determined using past harvest activity mapping, LIDAR imagery, and burn severity mapping followed by field reviews in accordance with the Region 1 Approach to Soils NEPA analysis (USDA FS 2011). Existing detrimental soil conditions within the units range from 0% to 11% (Table 9). Soil disturbances discerned during the reviews included old harvest roads, skid trails, landings, and severe burning. The following assumptions were used to estimate DSD for the proposed salvage units:

- Lidar linear disturbances “unknown features” – 2 acres DSD per mile of disturbance
- Past Harvest DSD
    - Tractor – 5% of past harvest area
    - Skyline – 2% of past harvest area
    - Helicopter – 1% of past harvest area

- Johnson Bar Fire DSD (based on USDA FS 2013)
    - Low severity – 0% of area
    - Moderate severity – 2% of area
    - High severity – 4% of area

Table 9. Existing conditions by harvest unit

Unit Number	Acres	Acres of Past Harvest	Post-fire Burn Severity (%)			DSD (%)
			Unburned and Low	Mod	High	
101	74	0.21	86%	14%	0%	0%
102	91	1.16	37%	63%	0%	1%
103	148	2.00	48%	51%	1%	1%
104	125	1.61	62%	38%	0%	1%
105	11	0.89	62%	38%	0%	8%
106	9	0.29	77%	23%	0%	3%
107	35	0.04	94%	6%	0%	0%
108	0	0.00	57%	43%	0%	0%
109	0	0.00	46%	54%	0%	0%
110	109	1.69	67%	33%	0%	2%
111	40	3.02	56%	44%	0%	8%
112	0	0.00	20%	80%	0%	0%
113	7	0.08	44%	56%	0%	1%
114	26	2.51	90%	10%	0%	10%
115	84	3.91	14%	58%	28%	5%
116	232	6.23	8%	50%	42%	3%
117	22	0.40	21%	77%	3%	2%
118	7	0.09	33%	67%	0%	1%
119	19	0.40	4%	89%	8%	2%
120	10	0.26	25%	73%	1%	3%
121	24	0.38	28%	72%	0%	2%
122	150	2.26	30%	66%	3%	2%
123	4	0.43	11%	88%	1%	11%
124	3	0.04	36%	64%	0%	1%
125	66	1.10	20%	79%	2%	2%
126	102	1.20	45%	51%	4%	1%
127	18	0.56	58%	42%	0%	3%
128	11	0	31%	48%	21%	3%

Unit Number	Acres	Acres of Past Harvest	Post-fire Burn Severity (%)			DSD (%)
			Unburned and Low	Mod	High	
129	52	1.26	16%	71%	12%	2%
130	0	0.00	100%	0%	0%	0%
131	101	1.49	34%	58%	8%	1%
132	26	0.73	24%	71%	5%	3%
133	17	0.18	48%	52%	0%	1%
134	121	1.40	47%	49%	4%	1%
135	42	0.08	90%	10%	0%	0%
136	19	0.69	57%	43%	0%	4%
137	13	0.04	86%	14%	0%	0%
138	23	0.57	83%	17%	0%	2%
139	26	1.45	73%	27%	0%	6%
140	29	0.57	39%	61%	0%	2%
142	40	0.14	83%	17%	0%	0%
143	45	0.08	94%	6%	0%	0%
144	95	0.17	91%	9%	0%	0%
145	273	1.94	65%	34%	1%	1%

Although not specifically addressed by a Forest Plan standard, the presence of above-ground organic matter or woody material is an important component of soil health. The retention of coarse (>3 inches in diameter) woody material is essential to maintaining soil productivity (Graham et al. 1994). Regional direction (USDA FS 2014) for organic material recommends following guidelines such as those contained in Graham et al. (1994) if more-specific local guidelines have not been developed. Graham et al. (1994) recommend 7–33 tons/acre of coarse woody material (depending on habitat type, moisture regime, and aspect). This amount should provide sufficient organic material for soil productivity over the long-term (100–300 years). Retaining existing coarse wood levels and allowing for recruitment through the natural addition of snags and/or standing trees would facilitate these benefits. Existing downed woody material ranges from 5 to 20 tons/acre in units proposed for project activities (visual observation). Litter and duff layers throughout the project area average 0 to 6 centimeters in depth. In areas of moderate to high burn severity, litter and duff was completely consumed; in low burn severity areas, litter/duff layers average 2 to 4 centimeters; and in unburned areas, duff/litter layers are approximately 4 to 6 centimeters deep. During 2016 field reviews, litter and duff layers in the moderate to high burn severity areas are recovering, with litter depth values in these areas between 1 and 3 centimeters.

Invasive Plants

Plants contribute to soil productivity through complex above and below ground linkages. In forest ecosystems, when non-native invasive plants replace native grasses and forbs, plant-soil feedbacks that maintain soils productivity can be altered (Putten et al. 2013). In order for invasive plants to significantly alter soil productivity, conditions must be right to allow establishment at a high enough density to change the native species compositions (Suding et al. 2004) Ecosystem disturbances, such as timber harvest and wildfire, can create conditions that favor large-scale invasions of non-native plants (Hobbs and Huenneke 1996). At present, populations of non-native invasive plants are not at the level that would trigger a large-scale invasion in the project area. In order to prevent a large-scale invasion following the 2014 wildfire and proposed harvest, the roadside weeds and isolated areas with higher densities of invasive plants must be regularly treated to control their potential spread and prevent degradation of soil productivity. Plans for invasive plant control are detailed in the FEIS and design criteria.

3.3.6 Direct and Indirect Effects

The spatial scope for direct and indirect effects is the individual salvage harvest units (variable acres) and associated temporary roads. The temporal scope is several decades (30-50 years), covering both the pre- and post-project activities. The only activities analyzed in detail are the salvage harvest units and associated temporary road construction.

3.3.6.1 Alternative 1

This alternative maintains the existing condition resulting from the Johnson Bar fire. Alternative 1 would not alter the current soil erosion or landslide potential and would retain the same amount of coarse woody material, both standing and down. Existing DSD would persist with very slight natural recovery of surface layers of compacted soils. Over time, large woody debris from dead trees would fall on the ground, increasing organic matter and water-holding capacities on-site.

Under Alternative 1, no road decommissioning activities would occur that would directly improve soil conditions by decompacting soils and adding coarse woody material and other organic matter to the existing road surface. Soils in these areas would remain in a less productive condition.

3.3.6.2 Alternatives 2, 3, and 4

Activities Not Analyzed in Detail

Road Maintenance and Reconstruction: Forest system roads are not considered in the determination of potential DSD (USDA FS 2011, 2014). Approximately 62 miles of road maintenance and reconditioning of haul roads are proposed under Alternatives 2, 3, and 4 and would include removal of brush, clearing of culvert inlets, grading of the roads for water flow control, and the removal of closure barriers as needed. Work would improve road drainage and reduce the risk of mass erosion.

In addition, there would be 5.6 miles of system haul road reconstruction under Alternatives 2, 3 and 4. This would include culvert replacements, road stabilization, and addition of cross drain culverts.

Helicopter Landings: All existing and new helicopter landings for the Johnson Bar project are associated with the permanent transportation system in the project area. As a part of the transportation system these landings are not considered in the determination of potential DSD (USDA FS 2011, 2014). BMPs and design criteria would be used to minimize soil erosion and guide restoration of these sites.

Road Decommissioning and Storage: Forest system roads are not considered in the determination of potential DSD (USDA FS 2011, 2014). Approximately 1.1 miles (5 acres) of system roads would be decommissioned, 20.1 miles (100 acres) of non-system roads, and 4.7 miles of road storage of system roads. Road decommissioning would directly improve soil conditions by decompacting soils and adding coarse woody material and other organic matter to the existing road surface. Road decommissioning would also improve slope stability and reduce the potential risk of mass erosion from culvert failure.

Decommissioned roads are considered as returned to the productive land base through removal from the transportation system. Soil structure, water infiltration, aeration, root penetrability, and soil biological activity improvements are observed with road decommissioning techniques used on the Nez Perce-Clearwater National Forests (Lloyd et al. 2013). Monitoring has shown decommissioning and storage treatments to be effective at reducing surface erosion and mass failure risk and increasing vegetative ground cover (Foltz 2007, Lloyd et al. 2013).

Under Alternative 1, no road decommissioning or storage activities would occur. Soils in these areas would remain in an unproductive or hydrologically unstable condition.

The 2015 Wash and Slide Fires were not considered as they occur outside of the analysis area for soils.

Activities Analyzed in Detail

Salvage harvesting activities and associated temporary road construction are analyzed in detail, as these activities can contribute to DSD calculations, cause erosion, and affect soil productivity.

Salvage Harvest: Alternative 2 proposes 2,348 acres of salvage harvest, of which 4% would utilize tractor logging, 39% would utilize skyline logging, and 57% would be through helicopter logging. Alternative 3 proposes 1,988 acres of salvage harvest, of which of which 1% would utilize tractor logging, 22% would utilize skyline logging, and 77% would be through helicopter logging. Alternative 4 proposes 1,349 acres of salvage harvest, of which 8% would utilize tractor logging, 57% would utilize skyline logging, and 35% would be through helicopter logging. Unit prescriptions would follow a tree retention methodology based on Region 1 tree survival guidelines. All live trees would be left as “leave trees”. In the absence of live trees, a combination of 14-28 live or dead reserve trees would be left per acre. Activity-generated slash piled along roadsides and in landings would be dispatched via sale of biomass materials, chipping, or burning. Slash within the units would be left in place or treated using jackpot burning if conditions outlined in the design criteria are met: low wildfire burn severity, low soil erosion hazard, and less than 55% slopes.

Temporary Road and Swing Trail Construction: For Alternative 2 approximately 2.8 miles of temporary roads would be constructed and 0.6 mile would be located on existing road templates. Alternative 3 proposes using 0.2 miles of existing temporary roads and no new construction. For Alternative 4 approximately 2.6 miles of temporary roads would be constructed and 0.31 miles would be located on existing road templates. Disturbed width for temporary roads would average 25 feet. In addition, there would be 4.3 miles of new swing trails constructed under Alternatives 2 and 4. Alternative 3 would not entail any new swing trail construction. Disturbed width for swing trails would average 15 feet. Temporary roads and swing trails would be located on low-gradient, dry ridges, or upper slopes and away from water; these roads would have no stream crossings.

Temporary roads and swing trails are considered 100% detrimental disturbance with reduced soil productivity until vegetation, organic matter, and hydrologic functions are restored. The greater disturbance associated with temporary road and swing trail construction is the displacement or mixing of the topsoil, including the Mazama ash cap. Temporary roads and swing trails would be constructed, used, and decommissioned within 1-2 years of harvesting activities. Decommissioning following use would promote restoration of soil structure, water infiltration, aeration, root penetrability, and soil biological activity, as observed with road decommissioning techniques used on the Nez Perce-Clearwater National Forests (Lloyd et al. 2013). These techniques would support recovery of productivity on soils disturbed by temporary roads and swing trails.

Landslide and Erosion Hazard Potential

Landslide-prone (LSP) areas were identified using GIS, LIDAR analysis, and field reviews by the project soil scientist. All potential landslide prone areas were excluded from the salvage harvest units. If additional landslide prone areas are identified, the area would be excluded from harvest and a PACFISH buffer would be added. **No harvest activities would occur in these LSP areas.** Indicators of landslide prone areas include: steep (over 60%) concave slopes; hydrophytic vegetation (i.e. sedges, moist site ferns); slumps, draws, and basins; past landslide locations; and obvious soil movement areas (typically indicated by curved and/or buttressed tree boles, soil creep, tension cracks, etc.).

The project area has been mapped into landtypes, which are areas featuring similar soils, hydrology, and vegetation characteristics. Soil erosion and mass wasting are natural processes and many landtypes across the Forest have high inherent hazards of erosion, mass wasting, and landslides (USDA NRCS 2006). These natural processes have occurred over long time periods and are fundamental factors in creating the present-day landscape. An erosion hazard assessment based on landtype properties was used to determine erosional characteristics of the project units and temporary roads/swing trails. This assessment was used to develop project design criteria to minimize erosion potential. Mass wasting, surface erosion, and subsurface soil erosion potentials were evaluated for the landtypes coinciding within the proposed harvest and burn units.

Surface erosion was rated as high on 117 acres (5%) of proposed units under Alternative 2, 93 acres (5%) of units under Alternative 3, and 36 acres (3%) of units under Alternative 4. Approximately 44-45% of the landtypes located in the proposed units are considered as high mass wasting potential and 87-90% of the units are located on landtypes considered high for subsurface erosion (Table 10). Generally, logging in areas with high risk for subsurface erosion is problematic only if the surface soil is removed and the subsurface and parent material is exposed, such as excavated skid trails and landings. By limiting tractor logging and apply design criteria and BMPs to the proposed project, the risk of increased erosion would be minimized.

Table 10. Acres of harvest activity on landtype hazards by alternative

Hazard	Alternative 2 (acres/%)	Alternative 3 (acres/%)	Alternative 4 (acres/%)
High surface erosion	117 (5%)	93 (5%)	36 (3%)
High subsurface erosion	1409 (60%)	1199 (60%)	1319 (98%)
High mass wasting	864 (37%)	755 (63%)	509 (38%)

Landtype erosion hazards used to assess the effects of the alternatives on soil stability and erosion potentials indicate an overall increase of erosion potential for each of the action alternatives. Surface soil loss through displacement and mixing with infertile substrata has long-lasting consequences for soil productivity. This loss occurs during temporary road construction, excavation of skid trails and landings, and displacement of soils during ground-based harvesting activities. Irreversible damage to soils could result from the loss of the volcanic ash cap. Although soil recovery could still occur in remaining subsurface soils, the exceptionally high porosity and water-holding properties of the Mazama ash cap would likely be irrecoverable. Even though the ash layer is not a significant source of soil nutrient content, loss of the ash layer reduces water-holding capacity and high-quality tree rooting material. Since volcanic ash is not easily replaced, these effects may be very long lasting.

Less than 200 feet of proposed swing trail is proposed on landtypes rated as high for potential surface erosion under Alternatives 2 and 4, with none under Alternative 3. Alternatives 2 and 4 have approximately 2 miles of proposed temporary roads and swing trails on landtypes with high subsurface erosion potential. Approximately 0.5 mile of proposed temporary roads and swing trails would be located on landtypes rated as high for mass wasting potential under Alternatives 2 and 4, with only 0.1 mile proposed under Alternative 3. Location on these landtypes is often only problematic if the surface soil is removed and the subsurface material is exposed. Skid trails and landings would be located and designated to minimize the area of soil disturbance.

Design criteria to reduce the potential for erosion include the following: limiting the amount of excavated skid trails and landings; fully decommissioning all excavated skid trails and landings on erosive landtypes; and placing large, woody material over the contoured slope for soil stabilization (design criteria for soils in Chapter 2).

The proposed temporary roads would be located on ridgetops and upper slopes, and only short, discontinuous portions would require some form of excavation. All temporary roads would be decommissioned after use, and large woody material (>3 inches in diameter) would be placed on the surface to aid in soil stability. An increased number of water bars or the addition of slash material to the road bed would be used as necessary to reduce erosion while the road is in use. Even if small segments in these roads cut into the subsurface material and some erosion does occur, the likelihood of sediment delivery to streams would be minimal, because temporary roads would be located on ridgetops far from stream channels.

Soil Productivity

Compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movements can all reduce site productivity. For the purpose of the proposed project, harvest units, temporary roads, and prescribed burn units are all considered Activity Areas.

Much research has been conducted on the extent of ground disturbance from harvest activities. Disturbance has been shown to range from 4% to over 40%, depending on equipment used, method and season of operation, and silvicultural prescription (Clayton 1981; Clayton 1990; McNeeland Ballard 1992; Tepp 2002). Megahan (1980) documented that the highest amount of disturbance came from tractor yarding, with lesser amounts from skyline and aerial methods. In order to estimate the potential increase in detrimental disturbance created by proposed activities, the following assumptions were made for ground-based skidding, skyline yarding, temporary road construction, and slash treatment:

- Detrimental soil effects from proposed ground-based skidding are estimated at 10% of an Activity Area. Monitoring conducted across the Clearwater Forest in 2008 showed that past ground based harvesting created an average of 14% DSD. This same monitoring report recommended several design criteria that could minimize detrimental disturbance. Based on incorporating the recommended design criteria and requiring rehabilitation of all project created detrimentally disturbed soils, it was determined that ground based effects would be lower than in the past and a 10% estimate was established for use. Design criteria include limiting activities to drier periods, designating skid trails, and limiting the extent of equipment when excavator piling of slash. DSD is generally limited to main skid trails and landings. Soil disturbance can be minimized by using existing skid trails and/or by designating the location of new skid trails (Froehlich and Adams 1984; Froehlich and McNabb 1983).

- Estimated detrimental soil effects from proposed skyline yarding are 4% of an Activity Area, and disturbance is mostly concentrated at landings.
- Estimated detrimental soil effects from proposed helicopter yarding are 2% of an Activity Area, and disturbance is mostly concentrated at landings.
- Effects to soil from temporary road construction are expected to span an average width of 25 feet wherever roads are built. This estimate is based on the assumption of a running road surface 12–15 feet wide and an additional 3–6 feet, cleared of vegetation, on each side of the road, where the soil would likely be displaced and the organic litter layer disturbed and/or removed. Swing trails would have essentially the same effects as temporary roads, due to the extent of soil disturbance and were analyzed the similarly.
- Activity-generated slash piled along roadsides and in landings would be dispatched via sale of biomass materials, chipping, or burning. Activity generated slash would be hand piled and jackpot burned if needed. Treatment of slash is incorporated in the estimated DSD discussed above.

The calculations based on the above assumptions are gross estimations and are best used to compare alternatives and develop design criteria for units that may have particular concern. Based on the above DSD assumptions, the proposed activities could cause soil disturbance on approximately 119 acres for Alternative 2, approximately 75 acres for Alternative 3, and approximately 100 acres for Alternative 4, with the estimated increase of DSD in the harvest units ranging between 1% and 10% (Table 11). The estimated increase includes skid trails, landings, swing trails and temporary roads that would be obliterated after project activities, so some measure of improvement would occur in those areas. The highest percent increase in soil disturbance would occur in units with proposed ground-based yarding methods. Some of these units have existing skid trails and landings that could be reused, thus minimizing the amount of new detrimental disturbance. Because no harvest units would exceed 15%, no harvest units require specialized project design criteria to meet Regional soil standards.

Table 11. Estimated increase in DSD per alternative

Unit	Acres	Alternative 2		Alternative 3		Alternative 4	
		Acres of New DSD	New DSD (%)	Acres of New DSD	New DSD (%)	Acres of New DSD	New DSD (%)
101	74	1.5	2%	1.5	2%	--	--
102	91	1.8	2%	1.8	2%	--	--
103	148	6.6	4%	5.4	3%	1	3%
104	125	4.0	3%	1.3	2%	2	3%
105	11	0.4	4%	0.4	4%	0	4%

Unit	Acres	Alternative 2		Alternative 3		Alternative 4	
		Acres of New DSD	New DSD (%)	Acres of New DSD	New DSD (%)	Acres of New DSD	New DSD (%)
106	9	0.4	4%	0.4	1%	0	4%
107	35	2.7	8%	1.6	15%	1	1%
108	0	--	--	0.0	0%	--	--
109	0	--	--	0.0	0%	--	--
110	109	9.4	9%	2.7	2%	4	4%
111	40	0.5	1%	0.8	0%	--	--
112	0	--	--	0.0	0%	--	--
113	7	0.1	2%	0.2	1%	0	2%
114	26	0.5	2%	0.5	1%	1	2%
115	84	3.4	4%	1.1	1%	3	4%
116	232	4.6	2%	0.4	1%	--	--
117	22	0.4	2%	0.1	1%	0	2%
118	7	0.3	4%	0.4	2%	1	10%
119	19	0.4	2%	0.2	1%	0	2%
120	10	0.2	2%	1.0	3%	0	2%
121	24	1.2	5%	3.9	2%	1	3%
122	150	5.5	4%	0.1	1%	5	3%
123	4	0.1	2%	0.1	1%	0	2%
124	3	0.1	2%	1.5	1%	0	2%
125	66	2.9	4%	2.0	2%	1	2%
126	102	2.0	2%	0.4	1%	--	--
127	18	0.4	2%	0.2	2%	0	2%
128	11	1.1	10%	1.4	1%	1	10%
129	52	2.5	5%	0.0	0%	1	2%
130	0	--	--	2.8	2%	--	--
131	101	5.0	5%	1.0	3%	2	2%
132	26	0.6	2%	0.3	3%	0	2%
133	17	0.3	2%	3.3	4%	0	2%
134	121	3.3	3%	0.8	1%	1	1%
135	42	0.8	2%	0.4	2%	2	4%
136	19	1.5	8%	0.3	1%	1	7%
137	13	0.3	2%	0.7	2%	--	--
138	23	0.8	3%	1.6	3%	1	9%
139	26	1.0	4%	0.6	2%	0	2%
140	29	0.6	2%	0.8	2%	1	2%
142	40	0.8	2%	0.9	2%	--	--
143	45	0.9	2%	1.9	2%	--	--

Unit	Acres	Alternative 2		Alternative 3		Alternative 4	
		Acres of New DSD	New DSD (%)	Acres of New DSD	New DSD (%)	Acres of New DSD	New DSD (%)
144	95	1.9	2%	6.6	2%	--	--
145	273	10.8	4%	7.9	3%	6	4%
Totals		**81.6**		**59.5**		**38.7**	

Implementation of project design criteria and BMPs would minimize DSD, and the decommissioning of skid trails, landings, and temporary roads would further improve soil condition. Decommissioning activities include decompaction, recontouring, adding organic matter, and seeding/planting. Soil remediation improves water infiltration, reduces potential for weed invasion, stabilizes slopes, and improves tree growth and vegetation establishment.

3.3.7 Effectiveness of Design Criteria

Past monitoring and research indicate that the effectiveness of the project design criteria would be moderate to high (Froehlich and McNabb 1983; Graham et al. 1994; Graham et al. 1999; Korband et al. 2004; Neary et al. 2008; Curran et al. 2005a, b). Skid trails, landings, and yarding corridors would be located and designated to minimize the area of increased detrimental soil effects.

3.3.8 Cumulative Effects

The spatial scope for cumulative effects is the individual salvage harvest units (variable acres) and associated temporary roads.

Areas affected by DSD can take several decades to recover, depending on soil texture, depth of compaction, and loss of organic material (Powers et al. 2005; Froehlich et al. 1983). Therefore, this analysis considers all activities from the 1950s to the present, as well as 20–50 years into the future.

Conditions in the project area are a result of both natural processes and human activities. Potential DSD within the analysis area could be attributed to fires (notably the Johnson Bar fire) or other past, present, or future management activities, including timber sales, thinning projects, dispersed recreation sites, and grazing activities. Ongoing and upcoming projects within the activity areas include forest restoration, firewood cutting, invasive weed control, and road maintenance. Recent and future restoration projects in the analysis area include BAER treatments and fire suppression rehabilitation for the Johnson Bar fire. Although there are numerous projects, disturbances, and semi-permanent features within the analysis area, the Johnson Bar fire is the largest factor that could affect DSD and erosion within the analysis area.

Ongoing and foreseeable future action within the proposed activity areas (salvage units and wildfire) consist of grazing, recreation, and fire suppression. Grazing effect could increase over a period of up to 10-20 years after a wildfire when more forage is available in the units. This is not expected to account for increased disturbance as livestock would trail along already disturbed skid trails and temporary roads that have been seeded. Recreation activities are not expected to increase in the harvest units, so an increase in detrimental disturbance would not be expected.

Fuelwood cutting and access is limited. Fire suppression activities could increase DSD but the timing and extent of such disturbances cannot be predicted.

Timber Harvest - Harvesting methods prior to the 1990s often consisted of hand felling trees, unrestricted tractor skidding, and extensive machine piling of slash. Ground-based logging occurred on slopes exceeding 35% and dense networks of excavated roads and skid trails were commonly constructed. These practices frequently resulted in extensive compaction, rutting, and areas of scraped or displaced topsoil and organic matter. Machine piling of slash often removed small organic material, large coarse wood, and topsoil. Forest practices have changed over the last few decades. Project design criteria, BMPs, and Forest Plan guidelines have been developed in order to reduce the extent of disturbance and maintain soil productivity. Design criteria, such as designated skid trails, retention of woody material, operating under dry or frozen conditions, and limiting ground-based skidding activities to slopes less than 35% are now common practices. Slash treatment techniques have changed from dozer piling to excavator piling along designated trails, so that less soil displacement and compaction occurs, reducing the detrimental effects to soil.

Since the 1950s, 22% of the project area has been harvested. Most harvest activities occurred between the 1960s and 1990s, with approximately 5,869 acres of intermediate and regeneration harvest. The most notable effects from harvest activities were compaction, displacement, and burned areas at landings. In steeper units, effects were more dispersed.

Some harvest on State and private lands has occurred within the project area. This harvesting was required to incorporate State BMPs to reduce soil impacts. These activities occurred downhill from any of the Johnson Bar Fire Salvage units and would not contribute to soil concerns within the project area units.

Fire - Approximately 18,236 acres (68%) have burned in the project area between 1870 and 2013. Evidence of past wildfires was noted in many of the units during soil surveys and effects from fire suppression activities were observed.

The Johnson Bar fire burned about 13,000 acres inside the project area. About 527 acres are classified as high burn severity, almost 6,000 acres as moderate burn severity, almost 6,000 acres as low burn severity, and the remainder was unburned or unclassified. High and moderate burn severity areas have 50 to 100 percent bare soil exposed; much of it with reduced capacity for water infiltration.

In 2015, two large fires, Wash and Slide burned in the Selway drainage. The Slide fire did not burn into the Johnson Bar analysis area, so it would not contribute to soil concerns in the area. Approximately 12 acres of the Wash fire did burn into the Johnson Bar project analysis area with a low intensity burn; there is not any DSD associated with this burn and it is not within any proposed treatment unit, so it would not contribute to soil concerns within the analysis area.

Roads - Roads also influence soil, with long-term to permanent impairment of soil productivity. Although system roads are excluded in the determination of whether projects meet Forest Plan and Regional standards, these roads are part of the existing condition for watershed function. Within the project area, approximately 93 miles or 560 acres of system roads occur where topsoil and subsoil have been displaced, mixed, or lost to erosion. This acreage represents about 2% of the project area.

Grazing - Effects from grazing are moderate due to most of the area being outside of the allotment, but tend to be highest near meadow areas, seeps, and springs. Effects within the units are transitory (in the form of livestock trails) and are mostly on the edges of units or along old skid roads. Grazing effects would likely be more dispersed through the fire area with the loss of canopy cover and increased ground vegetation.

Approximately 5 miles (25%) of the proposed road decommissioning would fall within the Tahoe-Clear Creek Grazing Allotment. There are potential cumulative effects from livestock use of these restored sites. The decommissioning of the roads would increase soil productivity and restore soil hydrologic function. The restoration rate of these sites may be hindered by the increased use of livestock on these sites but the sites would still be set on a restoration path by the proposed project activities.

Recreation - Recreation activities that were noted during field surveys include dispersed camping, off-highway vehicles (OHVs) and full-size vehicle use, fuelwood cutting, and hunting. Dispersed camping is generally located on already disturbed sites along system roads. Effects from recreation activities are primarily associated with full-size vehicles and OHVs using system roads during wet conditions, creating wheel ruts that concentrate water flow. Disturbance from recreation activities within harvest and burn units is anticipated to be negligible (less than one percent).

3.3.8.1 Alternative 1

This alternative would maintain the existing condition. It would not alter the current soil erosion or landslide potential and would retain the same amount of coarse woody material, both standing and down. Existing DSD would persist with very slight natural recovery of surface layers of compacted soils.

3.3.8.2 Alternatives 2, 3, and 4

The cumulative effects of these Action Alternatives were based on the estimated potential of increased detrimental disturbance (based on Region 1 Supplement definitions) when added to existing disturbance and to evaluate whether the project met Regional and Forest Plan standards.

The cumulative effects of past and proposed activities were determined by adding the estimated disturbance from the project (increase of 1%–15%) to the existing post-fire DSD (0%–11%). Potential cumulative DSD within the harvest units is estimated to be between 1.6% and 14.8% depending on alternative (Table 12).

All units would meet Regional soil standards without specialized design criteria. Design criteria were created though, to limit the amount of increased DSD from project activities and reduce the amount of existing detrimental disturbance by obliterating existing skid trails and landings. The project would meet the Regional soil standards by limiting the extent of detrimental disturbance to <15% following project implementation.

Table 12. Cumulative DSD for all alternatives

Unit	Acres	Existing DSD	Alternative 2		Alternative 3		Alternative 4	
			New DSD (%)	Cum. DSD	New DSD (%)	Cum. DSD	New DSD (%)	Cum. DSD
101	74	0%	2%	2.3%	2%	2.3%	--	--

Unit	Acres	Existing DSD	Alternative 2		Alternative 3		Alternative 4	
			New DSD (%)	Cum. DSD	New DSD (%)	Cum. DSD	New DSD (%)	Cum. DSD
102	91	1%	2%	3.3%	2%	3.3%	--	--
103	148	1%	4%	5.8%	3%	4.6%	3%	4.3%
104	125	1%	3%	4.5%	2%	3.1%	3%	4.2%
105	11	8%	4%	12.1%	4%	12.1%	4%	12.0%
106	9	3%	4%	7.2%	1%	3.8%	4%	7.3%
107	35	0%	8%	7.9%	15%	14.8%	1%	1.6%
108	0	0%	--	--	0%	--	--	--
109	0	0%	--	--	0%	--	--	--
110	109	2%	9%	10.2%	2%	4.0%	4%	5.1%
111	40	8%	1%	8.7%	0%	8.0%	--	--
112	0	0%	--	--	0%	0.0%	--	--
113	7	1%	2%	3.1%	1%	2.2%	2%	3.5%
114	26	10%	2%	11.7%	1%	10.4%	2%	11.7%
115	84	5%	4%	8.7%	1%	5.7%	4%	8.7%
116	232	3%	2%	4.7%	1%	3.5%	--	--
117	22	2%	2%	3.8%	1%	3.2%	2%	3.8%
118	7	1%	4%	5.3%	2%	2.9%	10%	11.6%
119	19	2%	2%	4.1%	1%	3.3%	2%	4.0%
120	10	3%	2%	4.6%	3%	5.7%	2%	4.6%
121	24	2%	5%	6.6%	2%	3.4%	3%	5.0%
122	150	2%	4%	5.2%	1%	2.1%	3%	4.6%
123	4	11%	2%	12.8%	1%	11.9%	2%	12.7%
124	3	1%	2%	3.3%	1%	2.6%	2%	3.6%
125	66	2%	4%	6.0%	2%	3.7%	2%	3.4%
126	102	1%	2%	3.2%	1%	2.0%	--	--
127	18	3%	2%	5.1%	2%	5.2%	2%	5.2%
128	11	2%	10%	12.0%	1%	3.1%	10%	12.3%
129	52	2%	5%	7.2%	0%	2.4%	2%	4.0%
130	0	0%	--	--	2%	1.9%	--	--
131	101	1%	5%	6.4%	3%	4.7%	2%	3.6%
132	26	3%	2%	5.1%	3%	5.6%	2%	4.5%
133	17	1%	2%	3.0%	4%	4.7%	2%	3.0%
134	121	1%	3%	3.9%	1%	2.4%	1%	1.8%
135	42	0%	2%	2.2%	2%	1.8%	4%	4.1%
136	19	4%	8%	11.3%	1%	4.6%	7%	10.3%
137	13	0%	2%	2.3%	2%	1.9%	--	--
138	23	2%	3%	5.8%	3%	5.8%	9%	11.2%

Unit	Acres	Existing DSD	Alternative 2		Alternative 3		Alternative 4	
			New DSD (%)	Cum. DSD	New DSD (%)	Cum. DSD	New DSD (%)	Cum. DSD
139	26	6%	4%	9.6%	2%	8.0%	2%	7.1%
140	29	2%	2%	4.0%	2%	4.0%	2%	3.9%
142	40	0%	2%	2.3%	2%	2.3%	--	--
143	45	0%	2%	2.2%	2%	2.2%	--	--
144	95	0%	2%	2.2%	2%	2.4%	--	--
145	273	1%	4%	4.7%	3%	3.3%	4%	4.9%

3.3.8.3 Irreversible and Irretrievable Commitment of Resources

Loss of the volcanic ash–influenced loess through erosion or removal (excavated temporary roads and skid trails) is irretrievable. Remaining soil materials would eventually develop (over a minimum of several decades) but may lack the water- and nutrient-holding properties of volcanic ash.

Small, localized areas would have reduced soil productivity until vegetation becomes reestablished and organic layers rebuild. These areas include temporary roads, skid trails, and landings. Severely burned areas and areas with deep compaction could take decades to recover (Froehlich et al. 1983). Soil improvement activities such as decompacting soils and adding organic matter (woody material) could jump-start this process (Curren et al. 2005a, b).

All project activities include BMPs, design criteria, or rehabilitative measures to avoid irreversible and irretrievable commitment of resources on the productive land base. Decommissioning of temporary roads and skid trails, which includes recontouring and recovery of excavated ash cap topsoil, is expected to initiate recovery of soil productivity functions over time, which could be as long as 40-60 years. Design criteria, such as keeping disturbance to less than 15% areal extent, re-use of existing skid trails in units, decompaction of skid trails and landings, and retention of woody debris are intended to avoid loss of the ash cap soil. Several design criteria were developed for inclusion in the proposed project due to the post-fire environment (Design Criteria, Chapter 2). These design criteria focus on erosion prevention by establishing ground cover after activities have ceased.

3.4 Hydrology

This section incorporates a revision of the 2015 Hydrologist Specialist's report for the 2015 Johnson Bar Fire Salvage Environmental Impact Statement. The report presents existing condition and the possible direct, indirect and cumulative effects of the proposed activities on watershed resources as well as an evaluation of how the proposed activities meet required laws, regulations, and Forest Plan standards related to water resources.

3.4.1 Analysis Area

The proposed actions in the Johnson Bar Fire Salvage project could affect water resources in and near the harvest units, roads, and road-adjacent areas. The analysis focuses on the Forest Plan prescription watersheds where proposed actions would occur. The effects on water resources will be analyzed at both the site-scale and larger subwatershed scales as needed to address consistency with NEPA, NFMA, Clean Water Act, Idaho State laws, and the current Forest Plan.

Direct and indirect effect areas are the nine Forest Plan prescription watersheds in which proposed project activities occur as well as the 5 prescription watersheds where log haul will occur (Figure 5). The cumulative effects area includes the 6th-HUC watersheds within the project area: Big Smith Creek-Middle Fork Clearwater, Goddard Creek-Selway River, and O'Hara Creek Subwatersheds, and the watersheds where activities outside these watershed may be of large enough-scale to impact water quality or water quantity within the project watersheds.

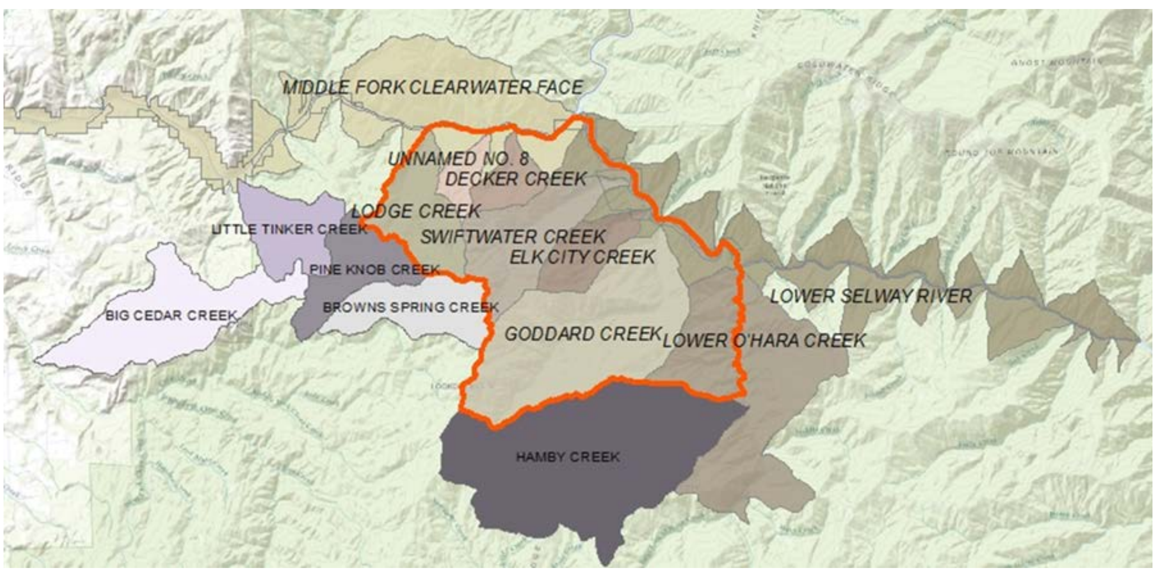

Figure 5. Forest Plan prescription watersheds in the Johnson Bar Fire Salvage project area

3.4.2 Regulatory Framework

Nez Perce Forest Plan direction and all Federal and State laws and regulations applicable to watershed resources will be applied to the proposed Johnson Bar Fire Salvage project. Project activities may result in short-term increases in erosion and probability of sediment delivery, but would not result in long-term erosion and sediment delivery to streams. Thus, all major streams in the project area are predicted to have maintained water quality conditions as compared to the existing condition, and would continue to support beneficial uses.

3.4.2.1 Nez Perce National Forest Plan

The Nez Perce Forest Plan (NPFP) (1987) guides all natural resource management activities by providing a foundation and framework of standards and guidelines for National system lands administered by the Forests. This proposed action responds to the goals and objectives outlined in the Forest Plan, and helps move the project area towards desired conditions. Forest Plan standards for water (pages II-21 to 22 and Appendix A) would apply to this project and would be met (Table 13). Forest wide management direction relevant to this project is summarized below.

The Nez Perce National Forest Plan (page II-2) direction states the following goals:

- Maintain or enhance stream channel stability and favorable conditions for water flow.
- Provide water of sufficient quality to meet or exceed Idaho State Water Quality Standards and local and downstream beneficial uses.
- Protect or enhance riparian-dependent resource
- Forest standards for water resources are found in the Nez Perce National Forest Plan on pages II-21 through II-22 (USDA 1987) and include:
- Apply best management practices to project activities to ensure water quality standards are met or improved;
- Use R1/R4 sediment and water yield guidelines;
- Evaluate site specific water quality effects and complete cumulative watershed effects analysis; and
- Meet fish/water quality objectives as outlined in Forest Plan Appendix A (including Forest Plan Amendments 5, 11, and 26) - Guidelines for percent sediment yield over base and entry level frequency per decade are established to approximate the maximum sediment yield allowable to meet fish/water quality objectives.

The Nez Perce National Forest Plan was amended in 1995, following a joint decision (commonly called PACFISH) by the U.S. Forest Service and Bureau of Land Management for managing anadromous fish-producing watersheds on Federal lands (Forest Plan Amendment 20). This amendment also includes direction for restoration opportunities and cooperation with other agencies and individuals. PACFISH buffer widths exceed state best management practice standards.

Table 13. Description of Forest Plan compliance

Forest Plan Standard Number	Subject Summary	Compliance Method
Nez Perce Forest Plan Standards		
1	Apply Idaho Water Quality Standards and BMPs.	Project design features and BMPs listed in Chapter 2
2	Utilize R1/R4 sediment yield and R1 water yield guidelines.	Effects analysis

Forest Plan Standard Number	Subject Summary	Compliance Method
Nez Perce Forest Plan Standards		
3	Evaluate site-specific water quality effects.	Field reviews in 2014-2016 and sediment modeling. See project file for field notes and photos.
4	Complete watershed cumulative effects analysis.	Completed a cumulative watershed effects analysis for the streams and Prescription Watersheds affected by the Johnson Bar Salvage activities.
8	Meet fish and water quality objectives in Forest Plan Appendix A (includes Forest Plan amendments 5, 11, and 26). Eight of 10 prescription watersheds have an upward trend requirement.	Project design criteria and BMPs listed in Chapter 2
Forest Plan Amendment 20 (PACFISH)		
WR-1	Promote ecological integrity through watershed restoration projects.	Project design criteria
WR-2	Cooperate with agencies, tribes, and private individuals.	Ongoing cooperation
WR-3	Prevent degradation (restoration is not a substitute for preventing degradation).	Project design criteria

3.4.2.2 Best Management Practices (BMPs)

A complete list of the effectiveness of the Design Features to protect water quality as well as a discussion of BMPs effectiveness are included in the project record (Appendix 1 of the Hydrology specialist report). Implementing projects with BMPs reduces our impacts to water quality and ensures the project will meet both Forest Plan standards and Clean Water Act objectives for water resources. The EPA provides a list of BMPs appropriate for forest roads and other forestry related activities in their guide National Management Measures to Control Nonpoint Source Pollution from Forestry (EPA 2005).

BMPs and design features were developed for this project using the National Core BMP Technical Guide (USDA 2012), field verification, and the best available science. Proposed BMPs and Project Design Features (PDFs) were also discussed with operations personnel to ensure feasibility for implementation effectiveness. Proposed BMPs and PDFs are discussed throughout the effects analysis of this report and are the primary mechanism to mitigate potential hydrologic effects from the project.

At the national scale, a consistent program to monitor BMP implementation and effectiveness has been in development for several years. Monitoring of BMP implementation and effectiveness using the Forest Service’s National BMP Monitoring protocols has taken place on the Nez Perce – Clearwater National Forest since 2012. Monitoring results from vegetation management projects indicate that BMPs intended to minimize effects to water, aquatic and riparian resources were successfully implemented, and BMPs intended to minimize effects from landings and ground-based mechanical harvest were successfully implemented, including landing location, spacing of skid trails, and retention of cover. Additional project-level BMP monitoring has occurred as part of project implementation on the Nez Perce – Clearwater National Forest. Monitoring results are cited throughout this report where they are applicable.

3.4.2.3 Clean Water Act

The Clean Water Act stipulates that states are to adopt water quality standards. Included in these standards are provisions for identifying beneficial uses, establishing the status of beneficial uses, setting water quality criteria, and establishing Best Management Practices (BMPs) to control non-point sources of pollution. Executive Order 12088 also requires the Forest Service to meet the requirements of the Act.

Section 313 of the Clean Water Act requires Federal agencies to comply with all Federal State, interstate, and local requirements, administrative authority, and process and sanctions with respect to control and abatement of water pollution.

Section 303(d) of the Clean Water Act stipulates that states must identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). For waters identified on this list, states must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. There are no streams in the project area listed for pollutants in the EPA approved 303(d)/305(b) 2010 Integrated report (IDEQ, 2011).

Section 404 of the Clean Water Act requires permits to remove or place fill within waters of the United States. The US Army Corps of Engineers administers these provisions. Culvert removal and replacement activities proposed under the Johnson Bar Fire Salvage project would require authorization under Section 404, through application of either nationwide or site-specific permits.

Section 402 of the Clean Water Act discusses permitting under the National Pollutant Discharge Elimination System (NPDES). In March 2013, the Supreme Court ruled that channeled runoff from forest roads did not constitute a pollutant from industrial activity and did not fall under the provisions of Section 402.

3.4.2.4 Idaho State Water Quality Standards

Environmental Protection Agency regulations require each state to adopt an anti-degradation policy as one component of its water quality standards. The objective of the Idaho Anti-degradation Policy is, at a minimum, to maintain and protect existing instream water uses and the level of water quality necessary to protect those uses (IDAPA 16.012501,01). Beneficial uses and water quality criteria and standards are identified in the State of Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02, IDAPA 37.03.02).

3.4.2.5 Idaho Forest Practices Act

This Act regulates forest practices on all land ownership in Idaho. Forest Practices on national forest lands must adhere to the rules pertaining to water quality (IDAPA 20.02.01). The rules are also incorporated as BMPs in the Idaho Water Quality Standards.

3.4.2.6 The Idaho Stream Channel Protection Act

This Act regulates stream channel alterations between mean high water marks on perennial streams in Idaho. Instream activities on national forest lands must adhere to the rules pertaining to the Act (IDAPA 37.03.07). The rules are also incorporated as BMPs in the Idaho Water Quality Standards.

3.4.2.7 Federal Executive Orders 11988 and 11990

Provide for the protection and management of floodplains and wetlands.

3.4.3 Analysis Methodology

Geographic Information System (GIS) generated reports and maps, aerial photos, and field reviews were used to analyze effects to water quality and quantity from the Johnson Bar Fire Salvage proposed activities. Resource condition observations were conducted in the field during fall 2014, following the Johnson Bar Fire. Forest stand database (FACTS-FSVeg) queries were conducted to identify past harvest activities and the timeframe they occurred (see project file). Information from the Selway and Middle Fork Clearwater Rivers Sub-basin Assessment (USDA Forest Service 2001) was used to develop the existing condition and cumulative effects evaluation.

The Water Erosion Prediction Project (WEPP) Hillslope Profile and Watershed Model (Elliot et al. 2000) and the Geomorphic Road Analysis and Inventory Package (GRAIP) (Black et al 2012) are both models developed by USFS Research Scientists to evaluate potential sedimentation from forest roads. The WEPP suite of models now includes tools for modeling hillslopes and impacts of management activities and provides more versatility and functionality than GRAIP for estimating sediment from sources other than roads. WEPP does not have local (on Forest) calibration; however there have been numerous peer reviewed publications that show sedimentation estimates from WEPP are generally +/-50%. The GRAIP model does not have local calibration and lacks peer reviewed publications to validate the model and its assumptions, though it has been used in numerous studies on National Forest and provides a useful tool for assessing likely problem areas for sedimentation on roads. A non-peer reviewed case study in Lolo Creek, on the Clearwater National Forest, estimated erosion from decommissioned and open roads (Black and Cissel 2011); however, no error estimates for the sediment yield predictions were included in this case study or other case studies reviewed. Consequently, defaulting to the +/-50% for sediment yield value is reasonable without additional information.

The Disturbed WEPP erosion model (Elliot et. al. 2000), and WEPP:Road (Elliot et al. 1995) were used to predict the level of erosion and sediment delivery produced from harvest units, temporary and skid trail road construction, and existing road use activities. The WEPP model is designed to predict sediment yield resulting from various forest management activities and the probability of sediment delivery, erosion, and runoff. The values obtained from the average activities was used to determine the magnitude of difference between activities and incorporated into the upward trend analysis.

In addition to WEPP, the NEZSED model was used to estimate the predicted percent increase in sediment yield over base (natural) conditions to determine if thresholds from Forest Plan Appendix A would be exceeded. The use of NEZSED is a Forest Plan standard and is useful for comparing alternatives. The NEZSED model was derived from the R1/R4 Guide for Predicting Sediment Yields from Forested Watersheds (USDA Forest Service 1981). The methodology for using the NEZSED model and the its limitations are described in detail in the Forest's guidance document, Implementation Guide to Appendix A of the Nez Perce National Forest Plan (Conroy and Thompson 2011). Sediment yield is calculated in tons per year and reported as “percent increase over base” conditions. Sediment yield is calculated for base conditions (without management activities), current conditions (cumulative of past and existing management activities combined with base conditions), and predicted conditions (cumulative of past, existing, and proposed activities combined with base conditions) for each of the proposed project alternatives. These percentages of sediment yield over base conditions are then compared to the sediment yield guidelines for prescription watersheds listed in Appendix A of the Forest Plan. Disturbance entries or the numbers of large activities in a decade are also calculated to compare with guidelines established in Appendix A of the Forest Plan. Additional information about the models used in this analysis and limitations can be found in the project file.

Model Accuracy: Erosion and sediment transport in forested areas and through mountain catchments is complex where large-scale processes such as climate, topography, vegetation type, geology, and time control erosion rates. Yet site-scale factors related to these larger-scale drivers (e.g., soil type, hillslope curvature, micro-topography, aspect) ultimately exert control over how (or if) sediment will be transported and routed from hillslopes to mountain streams. The spatial variability and complexity of site-scale factors make accurate model representation difficult. In general, erosion prediction models provide a coarse method for estimating potential erosion based on the larger-scale drivers such as climate, slope, geology, soil type, and vegetation cover. Therefore, applying hillslope estimates across landscapes and watersheds generalizes actual rates of erosion that may occur. Modeled erosion and sedimentation rates are recognized as highly variable. Neary et al. (2005) suggest that the average erosion value produced by a model is likely to be plus or minus 50% of the observed value. Rather than using models to estimate the amount of sedimentation in precise terms, it is more powerful to use models to identify locations of erosion hotspots in a project area and comparing the relative effects of a range of alternatives. Of the three models reported on NEZSED, WEPP, and GRAIP; only NEZSED has local calibration and evaluation of accuracy in the Selway.

NEZSED has been tested against field sampled data in several studies at three scales of watersheds across the Nez Perce National Forest (Gerhardt 2005). Three of these studies evaluating NEZSED occurred in the Selway River Subbasin. In a subwatershed-scale study (Horse Creek), Gerhardt and King (1987) found, on average, NEZSED over-predicted sediment by 23%. In a study evaluating NEZSED predictions for suspended sediment at 8 stream gaging sites at the outlet points of watersheds ranging in size from 5.7 to 113 square miles, NEZSED predictions were within 12% in average water years, but in higher than normal precipitation years, NEZSED under-predicted sediment (Gloss 1995). In a study at the Selway River Basin scale, results show that NEZSED predicted about 98% of the actual measured suspended sediment (USDA Forest Service 2001).

3.4.4 Resource Indicators

3.4.4.1 Water Quantity

Water yield refers to stream flow quantity and timing. Stream flow determines the amount of the energy available for erosion, transport, and deposition of sediment within channels. Increased water yields may be associated with channel scour, bedload movement, or redistribution of sediment in depositional areas.

Water yield generally increases after vegetative treatments due to a reduction in transpiration and precipitation interception losses. Removal of forest canopy can also affect snow accumulation and melt processes, often resulting in an increase in snowpack accumulation and melt rates, thereby increasing runoff rate and volume. Existence of roads and skid trails typically increase overland flow due to soil compaction and have impacts similar to timber harvest through the effects of canopy removal. Wildfires increase water yield through the loss of mature trees as well as effects to soils and soil cover. Where burn severities are high enough to cause forested hillslopes to lose organic material (soil duff) and fine woody debris, the loss of cover decreases overland flow resistance and surface water storage capacity. In severe fires soils can become more water repellant, contributing to elevated runoff.

While activities associated with the post-fire removal of trees have the potential to exacerbate these conditions through compaction, rutting, and displacement of soils, the primary control on changes in water yield in the project area is vegetation. The trees of the overstory canopy are key components of the water cycle intercepting precipitation, returning water to the atmosphere through evaporation, and shading the forest floor, which helps to retain snow pack as spring temperatures warm. The loss of the forest canopy in areas of higher tree mortality following the 2014 Johnson Bar Fire increase water yield in the project area. The proposed actions call for removing only dead or imminently dead trees, and removing dead trees will not result in meaningful change water yield from the existing post-fire conditions (Table 14). The results of the Equivalent Clearcut Analysis completed for the 2015 Johnson Bar EIS support this conclusion and are included in this report (FEIS Table 3-5).

Table 14. Project Activities will have little increase in ECA predicted water yield

Subwatershed (HUC6)	Existing ECA Post-Fire 2014 (%)	Project-related ECA increase (%)		
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Lower O'Hara Creek	5.8	0.2	0.1	0.1
Unnamed No. 8	26.3	1.0	0.2	0.3
Lodge Creek	19.7	0.2	0.0	0.0
Swiftwater Creek	21.4	0.8	0.1	0.4
Elk City Creek	32.8	1.4	0.0	0.4
Lower Selway River	5.1	0.2	0.0	0.0
Middle Fork Clearwater Face	9.5	0.0	0.0	0.0
Decker Creek	28.1	1.5	0.6	0.7
Goddard Creek	16.1	0.5	0.0	0.2

3.4.4.2 Water Quality

Water quality includes water temperature and pollutants such as nutrients, bacteria, and sediment. Of these potential pollutants the one of concern from proposed activities is sediment. Neither proposed harvest of dead trees nor road related activities will introduce pollutants such as bacteria or significantly alter nutrient cycles. The proposed harvest will not occur in any riparian areas; consequently, no vegetation serving as cover to shade streams will be removed, thus project activities will not alter water temperature. Grazing does occur in parts of the project area; however, none of the proposed actions will have any direct or indirect effect to alter grazing activities. The focus of this analysis will be on the potential to increase sediment delivery to the streams following proposed actions. Harvest activities and road related activities have the potential to increase sediment production and delivery into streams negatively impacting water quality.

Erosion is a natural process and sediment moving from uplands into a channel is an important process for maintaining functioning streams. Streams naturally sort and transport sediment downstream. When the amount of sediment exceeds transport capacity of the stream—that is, when an addition of sediment over the natural (balanced) amount—is delivered to a stream, the stream's ability to route the sediment out of the system can be overwhelmed, and water quality may be reduced. Wildfires, timber harvests, and road-related activities have the potential to increase erosion production and sediment delivery into streams.

Roads influence both water quantity and quality. They allow substantially less rainfall and snowmelt infiltration than occurs on undisturbed forest floors, intercept subsurface flowpaths, and concentrate runoff. Where connected to a stream, unpaved roads are often a source of sediment as well. While a watershed road density greater than three miles per square mile (mi/mi^2) is generally considered to be an impaired condition (NOAA 1998), lower road densities with high road-stream connectivity (locations where roads have erosional features connected to waterbodies) would likely be similarly impaired. The Johnson Bar Fire Salvage project includes design features to minimize sediment delivery into streams from all road-related project activity.

Water resource indicators for this project are as follows:

- Percent sediment yield increase over base as modeled using NEZSED
- Watershed road density

3.4.5 Affected Environment

The proposed Johnson Bar Fire Salvage project is located near the headwaters of the Middle Fork Clearwater River (Lochsa and Selway River confluence). The proposed project area is encompassed by the Big Smith Creek-Middle Fork Clearwater, Goddard Creek-Selway River, and O'Hara Creek subwatersheds (6th-HUC drainages). The proposed log haul routes extend through Upper Clear Creek subwatershed (6th-HUC), and the Big Cedar Creek Forest Plan Prescription Watershed. Note subwatershed designations have been recently been redesignated by the USGS and are now considered coded as HUC 12. As background, the United States Geological Survey recently completed a nationwide recoding of watersheds and updated terminology for how we refer to subwatersheds, replacing the HUC 6 term with a more accurate HUC 12 designation. On the Nez Perce-Clearwater National Forest the change in designation, represents a change only in terminology; the subwatershed boundaries, subwatershed names, and HUC numbers remained the same. This report retains the now outdated term, HUC 6, in order to reduce confusion between the original EIS and this Supplemental.

These subwatersheds are further delineated into multiple Forest Plan Prescription watersheds. Table 15 displays the existing condition of general watershed indicators for watersheds within the proposed project area and log haul area. Forest Plan prescription watershed boundaries and stream locations are displayed in Figure 5 and Figure 6.

3.4.6 Existing Condition

Municipal Watersheds

There are no municipal water supplies or source waters within or adjacent to the project. Forested seeps and springs are found throughout the project area and often mark the upper extent of perennial flow. Stream channels range from headwater channels that are relatively steep and confined (Rosgen A), to lower gradient Rosgen B and C channels (Rosgen 1996). During the fall of 2014 and spring of 2015, resource technicians evaluated conditions of roads, culverts, headwater perennial and intermittent channels, ephemeral draws, and springs and seeps within and downstream of proposed activity areas. The Fisheries Biological Evaluation for this project details characteristics and conditions of project area streams.

Water Rights

A query of water rights was made for the areas located in the Johnson Bar Fire Salvage project area. Eleven federal and six State of Idaho water rights were identified. Uses included administrative, storage, stock water, minimum stream flow, Wild and Scenic River designation, and irrigation. A summary of the proposed action alternatives discussed in this project would not alter any existing water rights claims nor decrease the available water relative to these claims.

Clean Water Act

Beneficial uses and water quality criteria and standards are identified in the State of Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02). Designated Beneficial Uses (IDAPA 58.01.02, Section 120) for the Middle Fork Clearwater River Sub-basin (HUC #17060304) and Lower Selway River Sub-basin (HUC #17060302) are cold-water biota, salmonid spawning, domestic water supply, and primary/secondary contact recreation. Designated Beneficial Uses for both the Middle Fork Clearwater River Lower Selway River (major streams in the project area) are cold-water aquatic life, domestic water supply, primary contact recreation, and salmonid spawning. Idaho Department of Environmental Quality (IDEQ) has not completed support status assessments for either streams with the exception of the Lower Selway River is listed as fully supporting cold-water aquatic life (Final Assessment Unit Status Report 2012). The tributaries of the Lower Selway and Middle Fork Clearwater have generally not been assessed but are listed as having beneficial uses including cold-water aquatic life, secondary contact recreation, domestic water supply, and salmonid spawning. The IDEQ direction is to improve or maintain water quality conditions in order to support beneficial uses. No streams within the Big Smith Creek-Middle Fork Clearwater, Goddard Creek-Selway River, Upper Clear Creek, and O'Hara Creek drainages are listed for pollutants in the EPA approved 2012 Idaho Department of Environmental Quality (IDEQ) 303(d)/305(b) Integrated Report (IDEQ 2012).

Watershed Condition and Water Quality

Prescription watersheds are assigned fishery/water quality objectives in Appendix A of the Nez Perce National Forest Plan. These objectives provide management direction in terms of the maximum estimated increase in sediment over baseline conditions that can be approached or equaled for a specific number of years per decade. Of the nine Forest Plan prescription watersheds in the Johnson Bar project boundary only the Elk City Watershed meets Forest Plan Objectives for Cobble Embeddedness. All of the watersheds are below Forest Plan sediment yield guidelines. Neither the Lower Selway Face Drainages nor the Middle Fork Clearwater Face Drainages have designated objectives or sediment yield guidelines. Of the 5 Forest Plan prescription watersheds where project activities will be restricted to log haul only (Big Cedar, Little Tinker, Pine Knob, Browns Spring, and Hamby), 4 are meeting Forest Plan sediment yield standards. Big Cedar Creek does not have a designated objective. Lower O'Hara Creek, Goddard Creek, and Lodge Creek prescription watersheds have an Upward Trend Requirement, which allows timber management to occur, concurrent with improvement efforts, as long as a positive upward trend in habitat carrying capacity is indicated. The sediment yield guidelines (the maximum sediment yield allowable to meet fish/water quality objectives) are shown for each watershed in the final section of Direct and Indirect Effects related to the outputs of the NEZSED model (Table 23).

In addition, entry frequency guidelines of 1 to 3 entries were also assigned in Forest Plan Appendix A. Few activities have occurred in any of the watersheds in the past 10 years to qualify as an entry, when considering sediment production. In 2014, about 5 acres of commercial thinning took place from the Lodge Point sale on the ridge top between Lodge Creek and Swiftwater Creek. In the Lodge Creek drainage, there was a 479-acre helicopter salvage sale in 2005. In 2015, the Lodge Point timber sale harvested 598 acres of timber in the Lodge Creek Prescription Watershed, with some of the units extending into Little Tinker and Unnamed 8 Prescription Watersheds. Also in 2005, a 100-acre helicopter patch harvest occurred in Decker Creek. These entries combined with the proposed project would not exceed entry limits requirements for the drainages in question. Other harvest activities identified predate the decade timeframe for the entry frequency guidelines.

3.4.6.1 Existing Roads

Forest roads can impact water quality by increasing sedimentation through mass wasting and surface erosion. Surface erosion occurs on all roads but particularly from roads with higher traffic levels that do not receive regular maintenance (Reid and Dunne 1984, Luce and Black, 1999). Surface erosion introduces fine sediments into streams degrading aquatic habitat (McCaffery et al 2007). The steep slopes and geology of the NPC also make many areas at risk for mass failure from roads (McClelland et al 1997). Roads in the project area concentrate overland flow and are potential sources and vectors of sediment to streams. Roads increase the volume of flow during large storm events through overland flow from precipitation on compacted road surfaces, as well as interception of subsurface flow in road cuts. Roads reduce vegetative cover in streamside areas and can accelerate erosion and sedimentation into streams (Megahan and Clayton, 1983).

At the Watershed-scale, increasing road density is correlated with declining aquatic habitat conditions and aquatic integrity because of increased instream sediment levels (Al-Chokhachy et al 2016). The ESA Matrix of Pathways and Indicators of Watershed Condition for Chinook, Steelhead, and Bull Trout, Local Adaptation for the Clearwater Basin and Lower Salmon (NOAA 1998) developed a regulatory framework to assess watershed condition in part based on road density where road densities less than 1 mi/mi^2 as properly functioning, from 1 mi/mi^2 to 3 mi/mi^2 as functioning at risk, and above 3 mi/mi^2 as not properly functioning. Table 15 identifies the watersheds within the project area that have road densities above the 3 mi/mi^2 road density threshold indicating that existing roads likely are contributing to instream sediment and degrading water quality. Table 15 also indicates watersheds where the only proposed action is log haul. The subwatersheds (HUC6) are shaded in light grey and the Prescription Watersheds are those with Forest Plan numbers.

Table 15. Existing condition for watersheds impacted by proposed activities in Johnson Bar

Johnson Bar Project Area Drainages	Watershed area (acres)	Road length in RHCA (miles)	Watershed Road density (mi/mi^2)	Stream-road crossings (#)	ECA[a] (%)
Big Smith Creek-Middle Fork Clearwater River[b] *6th field HUC #170603040201*	28,875 (85% UFS)	12.0	2.9	36	17
Decker Creek *Forest Plan #170603040009*	1,230 (100% USFS)	0.0	0.5	0	28
Lodge Creek *Forest Plan #170603040007*	2,970 (100% USFS)	1.5	4.5	44	20
Middle Fork Clearwater Face[c] *Forest Plan #170603040099*	25,100 (9,750 in HUC) (37% USFS)	8.9	2.1	13	10
Unnamed No. 8 *Forest Plan #170603040008*	870 (100% USFS)	0.2	1.2	2	26
Little Tinker (No harvest; log hauling Only) *Forest Plan # 170603040002*	2571 (90% USFS)	0	0.1	0	N/A
Goddard Creek-Selway River[b] *6th field HUC #170603020405*	22,725 (95% USFS)	8.6	1.9	33	20
Elk City Creek *Forest Plan #170603020123*	1,800 (97% USFS)	0.8	2.6	22	31
Goddard Creek *Forest Plan #170603020122*	9,250 (100% USFS)	2.1	1.7	56	16
Lower Selway River[c] *Forest Plan #170603020125*	12,000 (4,720) (89% USFS)	7.4	1.5	18	5
Swiftwater Creek *Forest Plan #170603020124*	3,925 (97% USFS)	4.2	2.9	50	21
O'Hara Creek[b] *6th field HUC #170603020404*	37,900 (100% USFS)	12.6	1.4	82	3
Lower O'Hara Creek *Forest Plan #170603020121*	9,610 (100% USFS)	4.2	1.2	36	6
Hamby Creek (No harvest; log hauling Only)[d] *Forest Plan # 170603020120*	(100% USFS)	N/A	N/A	N/A	N/A
Upper Clear Creek	19,123	6.3	3.1		N/A

Johnson Bar Project Area Drainages	Watershed area (acres)	Road length in RHCA (miles)	Watershed Road density (mi/mi^2)	Stream-road crossings (#)	ECA[a] (%)
6th field HUC #	(100% USFS)				
Pine Knob (No harvest; log hauling Only) *Forest Plan #*	(100% USFS)	Included abv	4.5	1	N/A
Browns Spring (No harvest; log hauling Only) *Forest Plan #*	(100% USFS)	Included abv	4.0	2	N/A
Big Cedar Creek (No harvest; log hauling Only) *Forest Plan # 170603040618*	1039 (71% USFS)	5.8	5	0	N/A

[a] ECA: Equivalent Clearcut Area
[b] Prescription Watershed (Forest Plan Subwatersheds) extends into additional 6th Level HUC
[c] 6th Level HUC may have other Forest Plan Prescription Watersheds that are not displayed as they are outside of the project's scope

At the site-scale, sedimentation from individual road segments can be highly variable depending on the position of roads on hillslopes, proximity of road segments to live water, road template insloped with ditch or outsloped, road surfacing, and level of road traffic (Elliot 2013). Delivery of sediment to streams from roads requires a connected segment of the road to live water (Gucinski et al 2001; Wemple et al 1996). Ridge-top roads are often disconnected from the stream channel network, but can influence watershed hydrology by channeling flows into small headwater swales, accelerating channel development. Mid-slope roads can intercept subsurface flows, extend channel networks, and accelerate erosion (Gucinski et al., 2001). Road-stream connectivity refers to sites where road segments have gullies, ruts, or any other erosion feature that connects to live (flowing) water, either intermittently or constantly, and that connection ultimately results in sedimentation into a stream. Roads adjacent to and crossing streams, or otherwise hydraulically connected to streams, have the greatest influence on streamflow, and sediment delivery to the stream system.

Along with surface erosion, sediment delivery from road failure serves as a key road-related sediment source in the project area. For the purposes of this document the following terms are considered synonymous: mass failure, mass wasting, landslide, and mass erosion. The mass erosion-related terms refer to erosion that happens in an episodic event, as opposed to more chronic surface erosion. In general, for erosion to classify as mass erosion/mass wasting/mass failure or a landslide, at least 10 cubic yards (close to a small dump load) of material must move at the same time.

During the winter of 1995-1996, three subsequent winter storms resulted in extreme rainfull (over 300% of the average annual precipitation fell in just these storms) on snowpack causing the snow to rapidly melt, the rapid melt and heavy rainfall resulted in floods across the Nez Perce – Clearwater National Forest and with the floods, came landslides. A peer reviewed study assessing the ’95-’96 landslides identified five important factors for identifying where landslides in the Clearwater Subbasin are likely to occur: slope angle, geologic parent material, landform, aspect, and elevation (McClelland et al 1999). Initiation points for ’95-’96 landslides were dominantly forest roads, nearly 60% of landslides started from Forest Roads, and most of the slides occurred on older, unmaintained roads. For the road associated landslides, improper drainage was the primary trigger for the landslides. Improper drainage resulted from either undersized or blocked culverts causing water to backup and pond, ultimately saturating the road surface or similar mechanism, but instead of streams and small tributaries ponding on the road, the source of the water is shallow subsurface groundwater. When the roads were built, these shallow groundwater paths are exposed by road cuts, and the flow seeps out of the road cutslope; in high runoff events like the winter rain-on-snow storms, this subsurface flow can pond on and saturate road surfaces. In the Johnson Bar project area, 58% of roads in the project area are built on terrain that has higher risk of landslides based on the factors identified in McClelland et al 1999. Field surveys show numerous areas of small fill failures along the roads in the project area. A 2011 GRAIP survey of the O'Hara Creek Road (FSR#651) forming the southern boundary of the Johnson Bar Project area found that of 8 failures along the road, only 1 of these failures delivered sediment into live water (NPT 2012). Similar surveys were not completed for the other arterial roads, but field reconnaissance found that along the Swiftwater Road (FSR #470), the key northern arterial route into the Johnson Bar project area, and FSR #653 near the western boundary of the project had at least 4 failures off the fillslopes of the road (failures starting just below the road). In these cases, it did not appear the landslides reached any water. Some of the older, unmaintained roads in the project that have not received regular maintenance do have additional failures. A failure does not necessarily mean that all sediment is delivered to a stream; however, on steep hillsides road failures often result in sedimentation into streams. In general, locations where these may occur are similar to those road locations where surface erosion results in sedimentation, including proximity to streams and slope position.

Modeling for sediment from existing roads was conducted using NEZSED and WEPP. NEZSED predicts that approximately 60% of the project area erosion (112 ton/acre/year) in the project area originates from the existing road system. Similarly, WEPP Road model runs compared to Disturbed WEPP results for erosion from harvest units, suggest that over 85% of the project area existing sedimentation initiates from the arterial roads in the project boundary.

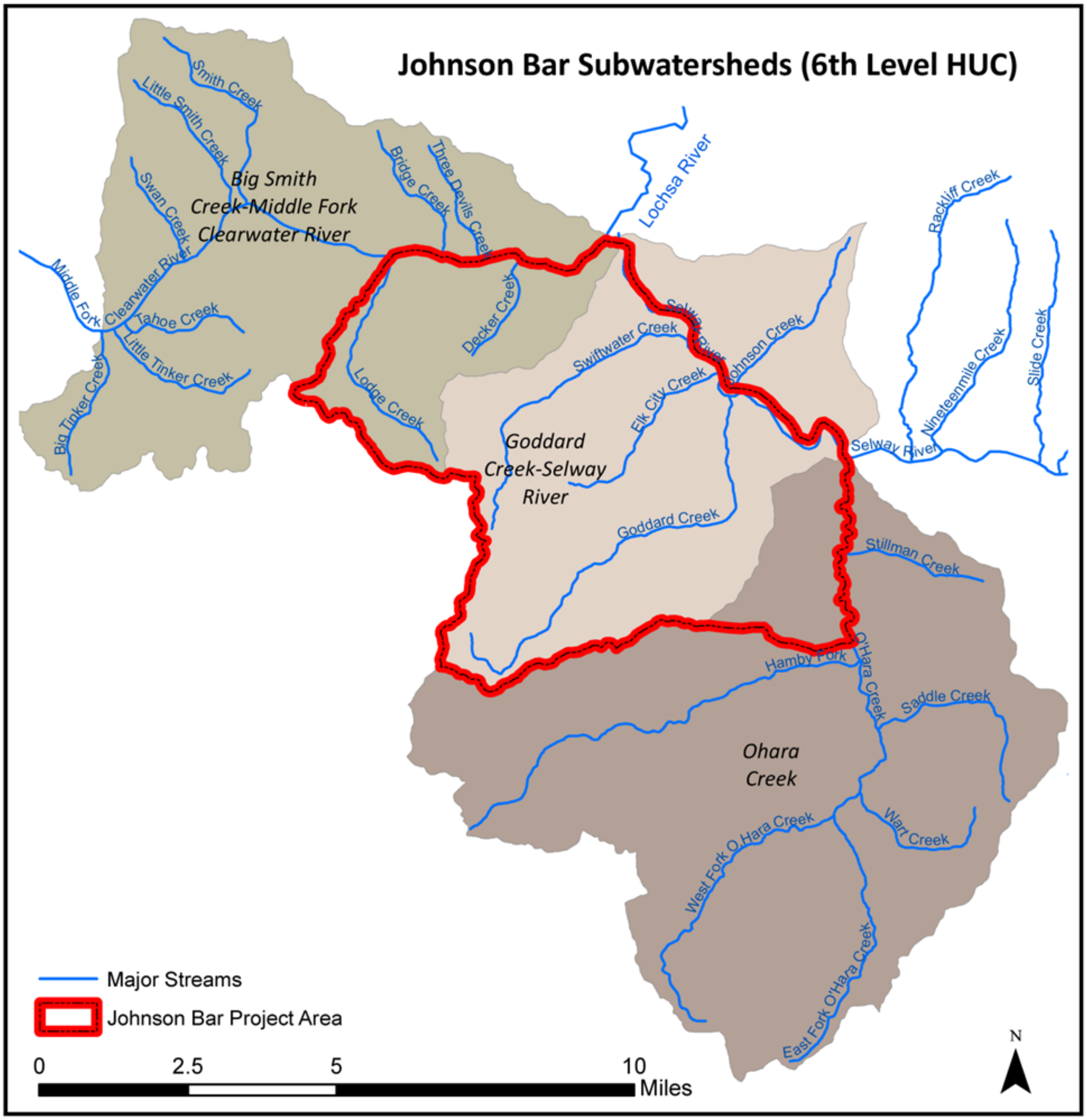

Figure 6. Johnson Bar Fire Salvage project area subwatersheds and major streams

3.4.6.2 Burned Hillslopes

The Johnson Bar fire is the most recent, large-scale disturbance in the hydrologic analysis area. This report uses burn severity to describe potential watershed effects of the Johnson Bar fire, and potential interactions with treatments in the Johnson Bar Fire Salvage project. Burn severity describes the effects of the fire on soil structure, infiltration capacity, and biotic components, and is used to indicate runoff and soil erosion potential from the fire. Burn severity maps were produced and field-verified as part of the BAER assessment for the Johnson Bar fire (USDA, 2014). Burn severity is defined through differences in surface organics, duff cover, and characteristics of mineral soils (Debano et al, 1998):

- Low severity – low soil heating, litter scorch or consumption with duff largely intact, mineral soil is not changed.
- Moderate severity – litter consumption with moderately charred or consumed duff, no visible alteration of mineral soil surface.
- High severity – complete consumption of duff and mineral soil surface visibly reddish or orange color.

Burned areas are vulnerable to accelerated soil erosion, which can increase post-fire sediment yield (Neary, et al., 2005). Increases in surface erosion following wildfires have been well documented (Helvey, 1980; Robichaud and Hungerford, 2000; Wondzell and King, 2003; and Neary et al., 2005). However, effects are spatially variable based on burn severity, as well as timing and magnitude of precipitation (Robichaud and Hungerford, 2000). Harvest and road-related activities on recently moderately and severely burned hillsides have the potential to increase erosion production and sediment delivery into streams. Areas adjacent to streams are the most likely to contribute to stream sedimentation. However, upland areas may be connected to the stream network via the road network, through intermittent channels or ephemeral draws.

There have been two growing seasons of vegetation recovery in the Johnson Bar project area. Aerial reconnaissance surveys completed in August of 2016 and field visits completed over the last two years, reveal that areas which experienced higher burn severities have experienced excellent soil recovery. In all areas categorized as having moderate and severe soil burn severity, grasses, forbs, and shrub communities have returned (Figure 7 and Figure 8). These areas now have 100% ground cover from vegetation and the natural mulch from leaf litter is accumulating. Given the amount of natural revegetation and ground coverage, the potential impacts from harvesting on burned soils is greatly diminished and will not be a primary factor for contributing to potential erosion.

The following pictures demonstrate the level of recovery throughout the Johnson Bar Area one growing season after the fire.

Figure 7. Unit 131, March 10, 2015

Figure 8. Unit 131, September 22, 2015

3.4.7 Direct and Indirect Effects

The direct and indirect effects area consists of the 14 Forest Plan Prescription watersheds in which the proposed project activities would occur (Figure 5 and Table 16).The temporal scale of the analysis for direct, indirect, and cumulative effects ranges from 1980 to 2037. The potential for short-term increases in erosion and sediment delivery associated with harvest and road decommissioning would last as long as soil is disturbed or exposed. Once vegetation and groundcover have stabilized disturbed ground surfaces, sediment related impacts would not be expected to persist. For management activities in harvest units, the potential for sediment delivery would be highest during project activities and in the first year following disturbance.

3.4.7.1 Alternatives 2, 3, and 4

Water Quality

Erosion and Sediment Delivery to Streams

Active erosion of the landscape occurs naturally and yields sediment to streams. When chronic or excessive sediment inputs occur, a stream's ability to route the sediment through the system is reduced and water quality and aquatic habitat can be diminished. Headwater streams and riparian area typically trap and retain much of the sediment that washes into them. The faster the water travels, the larger the particles it can carry. Natural obstructions in small streams, such as rocks, downed logs, or even just a bumpy stream bottom, slow water and cause sediment to settle out of the water column (Meyer et al. 2003). The higher energy (steep) stream channels of the Selway River Basin have the capacity to transport many tons of sediment through the stream network and river. However, it is possible to overwhelm the transport capacity and sediment will begin to accumulate and degrade water quality.

Hillslopes recovering from wildfire are more susceptible to erosion and elevated runoff in their natural state. Loss of organic material (soil duff) and fine woody debris reduces overland flow resistance, protection from splash erosion, and surface water storage capacity. Additionally, roads are known to concentrate surface water and provide a continuous source of sediment to streams. Roads allow substantially less rainfall and snowmelt infiltration than occurs on undisturbed forest floor. Roads intercept subsurface flowpaths and concentrate runoff and where runoff connects to a stream through an erosional feature, unpaved roads are often a source of sediment as well.

Harvest and road-related activities have the potential to increase erosion production and sediment delivery into streams. An effects analysis for this project provides a measure of the impacts associated with the proposed activities. The analysis includes results from sediment models (WEPP and NEZSED) to provide relative estimates of how past and proposed activities may affect sediment yield. Analyses includes all subwatersheds or Forest Plan prescription watersheds within the larger project area. Table 16 summarizes the acres of harvest and temporary roads for Alternatives 2, 3, and 4, the grey shaded watersheds are the subwatersheds (HUC 6) and the other watersheds are the Prescription watersheds that comprise the subwatersheds.

Table 16. Area and percent of prescription watersheds with harvest activities

Johnson Bar Fire Salvage Project 6th HUC Watershed and Forest Plan Prescription Watersheds	Acres of proposed salvage harvest			Proposed temporary roads (total acres)			Percent of total watersheds		
	Alt. 2	Alt. 3	Alt. 4	Alt. 2	Alt. 3	Alt. 4	Alt. 2	Alt. 3	Alt. 4
Big Smith Creek-Middle Fork Clearwater River	608	608	168	3	1	2	2%	2%	1%
Decker Creek	210	210	94	1.4	0.3	1.4	17%	17%	8%
Lodge Creek	79	79	55	0.2	0.2	0.2	3%	3%	2%
Middle Fork Clearwater Face	201	201	8	0.9	0.2	0.2	1%	1%	0%
Unnamed No. 8	117	117	12	0.5	0.0	0.5	13%	13%	1%
Goddard Creek-Selway River	1466	1106	940	16	1	15	7%	5%	4%
Elk City Creek	271	154	169	2.2	0.0	2.2	15%	9%	10%
Goddard Creek	491	491	419	4.4	0.0	4.4	5%	5%	5%
Lower Selway River	412	294	146	3.6	0.9	2.6	3%	2%	1%
Swiftwater Creek	292	167	206	6.0	0.0	5.7	8%	4%	5%
O'Hara Creek	274	274	242	4.4	0.0	4.4	0.7%	0.7%	0.6%
Lower O'Hara Creek	274	274	242	4.4	0.0	4.4	3%	3%	3%

Log Haul and Road Maintenance

Forest roads are the most likely source of sediment to project area streams, especially where roads used or treated are within RHCA's and near stream crossings. The sediment generated from these roads may be delivered during subsequent larger rain events after the project activities have ended. Log hauling and equipment use on roads both for road maintenance and log haul could increase rutting or cause damage to drainage structures that could exacerbate sediment delivery rates (Luce and Black 2001). However, sediment delivery from these roads would be reduced through application of BMPs, (i.e. repair of damaged drainage structures, timing restrictions, etc.) that have been shown to be protective of water quality and beneficial uses (Seyedbagheri 1996; Elliot et al. 2000). Haul roads can be a source of sediment to project area streams, particularly where there are existing sediment delivery points (roadside ditches leading to stream channels). Increased heavy-truck traffic related to log hauling can increase rutting and displacement of road-bed material, creating conditions conducive to higher sediment delivery rates (Reid and Dunne, 1984). The amount of sedimentation into streams from hauling traffic will be a function of road surface, volume of traffic, and the proximity of hauling to stream channels. The volume of log haul (number of return trips) will depend on the acres treated. Furthermore, the condition and type of surfacing on the haul route is directly related to how much sediment is generated from the travelway surface. All action alternatives involve the same miles of project roads and equivalent amounts of proposed road maintenance along haul routes and project roads. While return trips would be higher in Alternative 2, the main factors influencing sedimentation from log haul and road maintenance activities are the same. For Alternative 4, an estimated total of 3,928 would be hauled. About 50% (1,953 loads) would be hauled down Road 651, 8% (326 loads) would be on Road 470; and 42% (649 loads) would be on Road 286. This assumes all logs would be hauled in one season. There are 75 33 stream crossings in O'Hara Creek on log haul roads, 2 in Goddard and 10 in Lodge, 4 in Swiftwater, and 2 in Elk City Creeks. The NEZSED model runs suggest that the combination of log haul and required road work to improve drainage will double predicted erosion from the project roads in the first year, but will decrease road-related erosion in the following years.

Approximately 62 miles of road work is proposed and would include spot application of aggregate, and drainage improvement, including reshaping of road surfaces, as well as cross-drain reconnection, repair, clearing, and new installation, as needed. Application of road maintenance and hauling design criteria (e.g. blading/compaction, drainage improvement, aggregate surfacing) can substantially reduce erosion and sediment transport along haul routes in the longer term(Burroughs 1990, Grace and Clinton 2006, Swift and Burns 1999, Montana DNRC 2012). For example, well-designed and maintained road surface drainage, in conjunction with a properly graded road surface, should divert most road-surface runoff to the undisturbed forest floor, where conditions allow for sediment deposition and infiltration (Burroughs and King 1989, Montana DNRC 2012). At stream crossings and other areas where proper road drainage cannot prevent overland flow to a stream, gravel surfacing using high-quality aggregate would minimize sediment transport and delivery (Kochenderfer and Helvey 1987, Burroughs and King 1989, Sugden and Woods 2007). Road maintenance including both properly sizing and cleaning culverts and adding drainage features like cross drains or water bars dramatically reduces mass failures from roads (MacDonald et al 2008, McClelland et al 1999).

Additionally, properly applied log-hauling BMPs should limit any increase in sediment delivery from roads. BMPs have been developed to address potential effects to sediment indicators. These BMPs include avoidance of sidecasting materials into streams, avoidance of undercutting sideslopes during ditch maintenance, disposal of waste materials in approved areas to prevent entry into water ways. In all project areas, timber sale contract provisions require BMPs for road maintenance and log haul practices to reduce sediment. These BMPs also work in concert with the Project Design Features (PDFs) and Timber Sale Contract Provisions to protect water quality, such as preventing haul during conditions when the roads are saturated (Appendix 1 of the Hydrology specialist report in the project record). Timber Sale Contract Provisions, and restricting activities such as loading and turn arounds away from road drainage structures like culverts. Application of road BMPs, have been shown to be protective of water quality and beneficial uses (Seyedbagheri 1996; Elliot et al. 2000). BMPs and PDFs are compiled in Chapter 2 of this SEIS.

The proposed project upgrades of log-haul roads with surveyed sediment-delivery points will occur to reduce delivery prior to commencement of tree removal and hauling. Sediment delivery points were modeled using the WEPP Roads module (Elliot, 2000) in order to estimate existing conditions as well as potential reductions in sediment delivery resulting from project road improvements. Results indicate that project road work would result in a decrease in sediment delivery of roughly 77% in the few years following work. The critical BMPs for mitigating the short-term increases in sediment and preventing sediment delivery into stream from road work and traffic are maintain vegetated ditches and maintaining the RHCAs which provide vegetated buffers to filter sediment from reaching live water. Riparian areas along haul roads did not burn. On forest monitoring shows that maintaining the riparian vegetation in the RHCA buffers eliminates sediment delivery from surface erosion along road segments (USDA, NPC, 2016). On forest results are supported by peer reviewed research which shows intact riparian buffers can filter over 90% of road-related sediment (Clinton 2011, Ziegler et al 2006).

Sediment delivery into streams from both surface erosion and mass failure is dramatically decreased where road construction or improvements incorporate constructed drainage features like cross-drains, properly sized culverts that can accommodate higher flow events, and where vegetated buffers exist around streams (Elliot 2013, Opperman et al 2005). Graveling of road surfaces reduces sediment production (surface erosion) by reducing the surface area of soil exposed to raindrop impact, tire friction, and adverse effects of vehicular weight (Megahan et al. 1991), though in some cases with more traffic the fines from gravel can become a sediment source themselves (Eliot 2013). In a study that compared erosion from both native surface and graveled road segments, native surfaces generated 7.5 times more sediment than graveled road segments (Brown et al. 2013). Unlike with extensive peer reviewed research related to chronic sedimentation from surface erosion from roads, there are few peer reviewed experimental studies directly quantifying how road maintenance reduces sediment delivery from mass failure/landslides. Several studies do show that roads which do not receive regular maintenance of drainage structures like culverts or features like cross drains have higher rates of failure (McClelland et al 1999; Furniss et al 1991).

Temporary Road Construction to Support Harvest Activities

The differences between proposed amounts of temporary road construction are the key road related differences between the three proposed alternatives. Table 17 below details the different level of proposed temporary road construction between alternatives.

Table 17. Proposed temporary road construction for each alternative

Temporary Roads	Alt 2	Alt 3	Alt 4
New-miles			
Temporary	2.8	0	2.6
Swing trails	4.1	0.2	4.1
Existing templates- miles			
Temporary	0.6	0.2	0.3
Swing trails	0.3	0	0.3
Total	**7.8**	**0.4**	**7.3**

Key factors determining how temporary roads may increase erosion include location of temporary road on the hillside, number of stream crossings, and whether the temporary road is a new construction or reopening of an existing road template.

The proposed temporary roads generally would be located on low gradient ridges or upper slopes and would not connect to ephemeral draws or stream channels. Where the temporary roads are located outside of the harvest units the sedimentation from the roads are included in the NEZSED runs. NEZSED estimates a higher rate of erosion from roads on steeper slopes (slopes below ridgetops are steeper than the ridgetops themselves) and factors erosion based on the landtypes to account for areas where soils and climate tend to higher erosion rates.

Twenty-two of the thirty proposed temporary roads are in areas of patchy, generally low severity burn or unburned terrain. Any runoff from these roads would drain to forest floors where infiltration and deposition of any sediment load would occur. The other eight temporary roads would be in upland areas. Given their location, and required BMPs and PDFs, the proposed temporary roads would be unlikely to contribute sediment to project-area streams. Roads will be monitored during project activities, and any instances where concentrated road runoff reaches an ephemeral draw would be slowed and filtered using properly installed straw bales, wattles or sediment fencing. Temporary roads would be closed to public motorized use during project activities, reducing the chance of increased erosion produced when vehicles drive on wet roads and rut surfaces. Finally, all temporary roads would be obliterated following timber harvest activities, which would eliminate erosion potential in the future.

Depending on the alternative, zero to seventeen swing trails are proposed (4.4 miles under Alternatives 2 and 4 and 0.3 under Alternative 3). A swing trail is a ridgetop skid trail upon which logs are skidded from a skyline site to a haul road. The proposed swing trails would be located on ridge crests, disconnected from stream channels or ephemeral draws, and thus are not expected to contribute sediment to streams. Skid trails will be decompacted and stabilized as described in the project design criteria.

Disturbed WEPP allows users to estimate sedimentation from skid trails and temporary road construction. Disturbed WEPP estimates an average of 0.15 tons/acre of upland erosion from skid roads in the ground-based units for each Alternative. In these units the level of erosion delivering to streams decreases to 0.001 tons/acre when models are run with the proposed Design Criteria in place, most importantly the PDF maintaining RHCAs around all seeps and streams. For temporary road construction, WEPP road predicts for roads built along ridgetops in the proposed units, with lower slope gradients and intact RHCAs the amount of erosion occurring during the first year at 8 ton/acre with about 0.2 ton/acre (±0.1 ton/acre) of that amount delivering to the vegetated buffer (80% Probability of Delivery). The NEZSED model does not directly estimate sediment from skid trails or temporary roads constructed within the harvest units. Instead, NEZSED includes estimates of erosion from skid trails and temporary roads within proposed harvest units as a part of total estimated sediment prediction for each unit based on harvest method. NEZSED factors ground-based harvest at a much higher level of erosion than cable or helicopter methods because of the assumption of construction of more skid trails and temporary roads with ground-based methods.

In this report, temporary roads constructed outside the harvest units are run as new road construction. Temporary road segments location outside harvest units are included in the calculations for project roads. Table 18 compiles NEZSED predicted potential sediment yield from temporary roads for Alternatives 2 and 4, these values are used in the estimates for the % increase in sediment yield as a result of proposed actions. Alternative 3 has no proposed temporary roads outside of harvest units. Once the temporary roads and skid trails are rehabbed through obliteration and left with the required mulch cover, sedimentation estimates go to 0.

Table 18. NEZSED predicted sediment yield from temporary roads constructed to support harvest-for the segments of roads outside the harvest units

	Temp Roads Outside of Unit		NEZSED Predicted Erosion for 1st year
Forest Plan Rx Watersheds	Existing	New	ton/acre
Big Cedar Creek	0.00	0.00	0.00
Browns Spring Creek	0.00	0.00	0.00
Decker Creek	0.00	0.00	0.00
Elk City Creek	0.00	0.00	0.00
Goddard Creek	0.25	0.00	1.06
Hamby Creek	0.00	0.00	0.00
Little Tinker Creek	0.00	0.00	0.00
Lodge Creek	0.00	0.00	0.00
Lower O'Hara Creek	0.00	0.00	0.00
Lower Selway River	0.00	0.00	0.00
Middle Fork Clearwater Face	0.00	0.00	0.00

Forest Plan Rx Watersheds	Temp Roads Outside of Unit		NEZSED Predicted Erosion for 1st year
	Existing	New	ton/acre
Pine Knob Creek	0.00	0.00	0.00
Swiftwater Creek	0.00	0.00	0.00
Unnamed No. 8	0.06	0.06	0.72
Total	**0.31**	**0.06**	**1.78**

Harvest Units

The Johnson Bar fire left hillslope conditions conducive to elevated erosion and sediment transport to streams on hillslopes burned with moderate to high severity effects. Numerous studies show that the practice of post-fire salvage logging increases erosion and instream sedimentation significantly more than areas without harvest (Slesak et al 2015; McIver and McNeil 2006; Beschta et al 2004; Silins et al 2000). Many of these studies show that erosion and sedimentation increase proportionally to burn severity and in most harvested areas the roads and skid trails contribute the majority of sediment (Smith et al., 2011; McIver and McNeil, 2006; Stabenow et al., 2006). One study compared the impacts of logging system on severely burned slopes and found that sediment production from the skidder plots was 10–100 times the value from the controls. Adding slash to skid trails increased total ground cover by 20–30% and reduced the sediment yields by 5–50 times compared to the untreated skidder plots." (Slesak et al 2015; Wagenbrenner et al 2015). In general, ground-based harvest systems, increase compaction and sedimentation compared to other harvest methods and the impacts to soils increase with burn severity (Wagenbrenner et al 2015; Reynolds et al 2011; Page-Dumroese et al 2006).

In Johnson Bar project area, after two years of revegetation post-fire soil conditions have recovered significantly. In all units ground cover and vegetation now protect the recently burned soils from surface erosion. Under pre-fire conditions, many project-area ephemeral draws rarely if ever conveyed surface flows to headwater intermittent channels. Some of these areas may still have reduced infiltration and elevated runoff in the post-fire setting compared to conditions before 2014; however, the soils in the harvest units will now respond more similarly to harvest on unburned soils.

Harvest activities on any soils have the potential to influence erosion and sediment delivery to streams, positively or negatively. In the proposed project, removal and yarding of trees using mechanized equipment would likely temporarily expose mineral soil to erosion, and may create new (or exacerbate existing) vectors for sediment transport to stream channels. Project activities could expose sediment to overland flow in harvest areas, on skid trails, skyline corridors and landings, and at ditch crossings.

Project design features would greatly reduce the probability that any eroded sediment would reach a stream channel or ephemeral draw. The proposed harvest methods have very little proposed ground-based harvest (Table 19). Relying on cable and aerial logging systems will minimize the probability that project activities would result in elevated erosion and sediment delivery to streams. Tractor skidding of logs would occur on skid trails and swing trails, and is the harvest activity that has the greatest potential to cause soil erosion, as well as sediment delivery where connected or near to streams. Tractor units in this project would be limited to ridgetop locations, where shallower slopes and project layout help prevent erosional features forming to concentrate runoff and connect that runoff to streams or live water. Figure 9 and

Figure 10 show examples of proposed temporary road construction and their topographic position. Designing roads on ridgetops or close to ridgetops help increase stability and decrease concentration of flow on steep slopes leading to erosion and/or slope failure. Intentionally designing roads away from locations where stream-connectivity is high combined with PDFs should result in only minor amounts of sedimentation and no impairment of water quality.

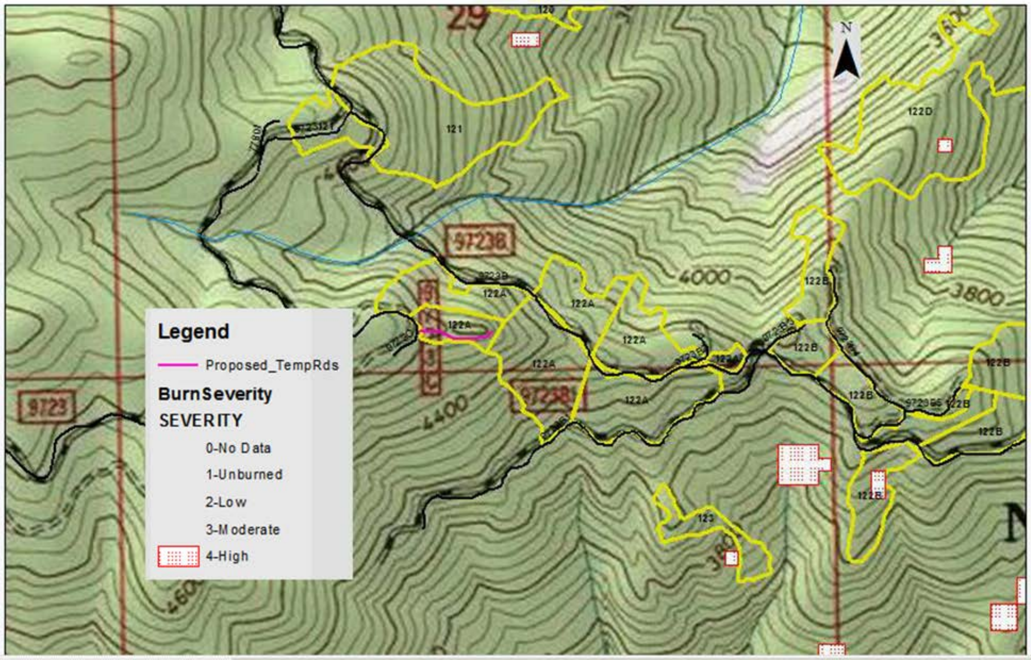

Figure 9. Shows a short temporary road built on the ridgetop within Unit 122A (Alternative 4). As this road is entirely within the Unit, the sediment yield from the road would not have been evaluated individually in NEZSED.

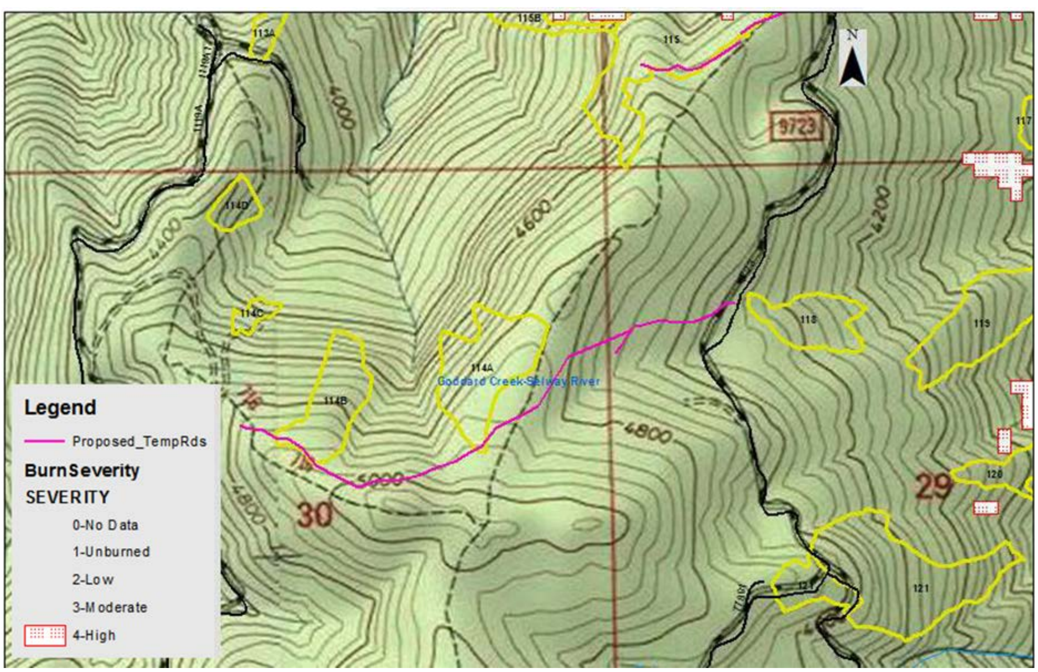

Figure 10. Proposed road (1 mile) to reach Units 114A-D from FS Rd #9723, where only half the road is on the ridgetop. In this case, the road is outside of the proposed units and the sediment yield

would be estimated in NEZSED as a new construction temporary road. This road exceeded acceptable resource impacts and was dropped and units converted to helicopter yarding

Helicopter and skyline harvest methods are low-affect approaches where trees are cut by individual fallers and rigged to cables which suspend the logs as they are hauled, either partially (skyline) or fully (helicopter), to landings. In helicopter units, ground disturbance would be minimal. In skyline units, linear soil disturbance would likely occur along the corridors where logs are hauled upslope to landings. Unmitigated, these corridors have the potential to concentrate overland flow given their typical linear arrangement on the fall line of the slope. Project skyline corridors would terminate at considerable distances from stream channels or ephemeral draws, leaving them unlikely to connect to streams. Nevertheless, the probability of erosion and sediment delivery would be substantially reduced by lining corridors with slash, and installing waterbars if needed during and following yarding operations in order to avoid development of preferential surface flowpaths.

Table 19. Proposed acres for harvest by logging system in each alternative

Activity	Alt.1	Alt.2	Alt.3	Alt.4	Comments
Total Acres - Fire Salvage Harvest Units	0	2348	1988	1349	Variable Retention; 20 to 85% tree removal. Anticipate acres reduction for RHCA/LSP
Logging System (acres)	0	Trac-105 (4%) Sky-915 (39%) Heli-1328 (57%)	Trac-23 (1%) Sky-432 (22%) Heli-1533 (77%)	Trac-108 (8%) Sky-772 (57%) Heli-469 (35%)	Alt 3 converts most tractor acres to skyline or heli. Percent based on Alt total acres.

Potential erosion from proposed units were evaluated using Disturbed WEPP in order to estimate effectiveness of proposed erosion control design criteria. The Disturbed WEPP simulations model potential erosion from hillslopes for each proposed method of harvest. The models were run using the climate inputs from the Fenn Ranger Station weather station with adjusted elevation for project units and assuming silt-loam soils for all the units. The simulation parameters are detailed in Table 20.

Table 20. Disturbed WEPP results for harvest units, averaged by logging system and burn severity

Logging System	2014 Burn Severity	WEPP Treatment	30 Year Average		Probabilities of Occurrence in First Year Following Disturbance		
			Erosion (ton/acre)	Sediment Delivery off-site (ton/acre)	Runoff %	Erosion %	Sediment Delivery off-site %
Ground	Low-Moderate	Tall Grass	0.01	0.0089	80	17	17
Skyline	High	Tall Grass	0.05	0.0534	100	23	23
Skyline	Low-Moderate	Shrubs	0.01	0.0089	80	13	17

The results of this evaluation suggest that in the absence of erosion-control design criteria, disturbance in skyline corridors typical of the project would lead to greater erosion and downslope sediment transport than the existing condition. In order to contextualize whether this increase would result in delirious effects to water resources, several runs were completed in WEPP for preharvest conditions and then existing conditions with 2 years recovery following a wildfire. The WEPP output provides a range of sediment delivery from 0 to 0.0039 ton/acre, an increase hillslope erosion and potential delivery to riparian buffers between 1% and 5%, depending on slope steepness and slope length. To compare, the Johnson Bar Fire Salvage included a WEPP analysis to analyze how the design criteria of leaving slash as a natural mulch cover following harvest leaving up to 85% coverage on post-harvested soils. The erosion modeling suggests that placement of slash (85% ground cover) on bare soil within skyline corridors would reduce the likelihood of corridor erosion and sediment transport below that of the existing (2014 post-fire) condition to nearly 0 tons/acre. These conclusions apply to each action alternative. It would be unreasonable to assume that no sediment from harvest units will ever reach a stream, given the variability in runoff conditions and in an intense rainfall event, runoff could reach a point where overland flow could transport some sediment past a vegetated buffer. However, the probability of this is low and the amount of sediment transported would be low compared to natural erosion. Completed monitoring by the Nez Perce-Clearwater National Forest of 23 miles of PACFISH buffers following harvest activities show no incidences of sediment transport through the vegetated riparian buffers (USDA-Nez Perce-Clearwater National Forest).

The project design features require scattering of fine woody debris (slash) to achieve an 85% surface cover (approximately 5-10 tons per acre) on treatment unit hillslopes burned at moderate to high severity. In addition to the fine woody debris, coarse woody debris (greater than three-inch diameter) would be retained at the rate of 17-33 tons/acre in all units, regardless of burn severity. The fine woody debris requirement specifically addresses erosion concerns. While the coarse woody requirement addresses soil biological function, it too would help to reduce erosion and sediment transport. Reduction in erosion would be similar under all of the action alternatives.

In addition to surface erosion, sedimentation from harvested areas can occur as a result of mass failures/landslides. The roots of live trees act as a stabilizing force to soils; removing these trees increases hillslope susceptibility to landslides (Schmidt et al 2001). However, the project proposes removing only dead or dying trees, which no longer provide support to soils. The building of temporary roads and skid trails over unstable terrain (steep slopes, seepy-wet areas, pre-existing landslide) can create knick points to collect water and undermine slope stability. The concerns about slope failure from roads and related harvest activities are why such careful attention is paid to site location for all roads and trails required to support harvest and full obliteration of the roads/trails following harvest. Before units are finalized, Soil Specialists and Foresters identify all terrain that has risk factors for slope failure (details in Soil Specialist report). These areas are removed from the project by creating a RHCA buffer around the high risk area (see Design Criteria).The buffering of landslide prone terrain will mitigate potential mass failure risk in harvest units.

Road Decommissioning

Road erosion and sediment yield usually decline over time, but frequently continue at a chronic level indefinitely (USDA, 1981). One of the most important actions to reduce potential sedimentation in the project area is decommissioning unneeded roads. The highest incidence of road associated landslides occur from old (built before the mid-1970’s) overgrown roads previously considered naturally recovered by managers (McClelland et al 1997). Usually failures happen on these older roads because of failed drainage structures. During an extreme precipitation event (like a rain-on-snow event), the excess runoff ponds on the road causing the road and fill slope to become super-saturated. The supersaturated soil has no cohesion and landslides result.

In the same post-landslide analysis on the Clearwater National Forest, the researchers had the opportunity to evaluate whether the decommissioned roads in the study area had any landslides. These decommissioned roads had all drainage structures (usually culverts) removed and natural drainage restored and hillslopes recontoured. Researchers found that on the 37 miles of decommissioned roads there were zero landslides; however, adjacent stretches of roads where there had been no decommissioning experienced multiple landslides-despite these roads having grown in with vegetation. Researchers estimate an additional 10 landslides would have occurred without road decommissioning, potentially introducing several hundred additional cubic yards of sediment to stream systems.

Approximately 21.2 miles of road are proposed for decommissioning under each action alternative. For these routes, decommissioning is defined as mechanical decompaction, recontouring, and surface stabilization with slash and native vegetation. Stream crossings would be restored by removing all culverts and reshaping terrain contours and stabilized with slash and native vegetation, and mulch where needed for short-term erosion control.

Road density would be reduced due to project road decommissioning in five of the Forest Plan prescription watersheds (Table 21). Moreover, segments (totaling 6.1 miles) of 25 roads to be decommissioned are within 150 feet of a stream channel. A total of 70 culverts would be removed as a result of road decommissioning and road storage, which would reduce the risk of potential future crossing failures (Foltz et al, 2008; McCaffrey et al, 2007; McClelland et al 1997). As a rough estimate based on average road size, there are approximately 100 cubic yards of fill material that will be removed and stabilized at each crossing. Road decommissioning equates to a total of 7,000 cubic yards (700 dump truck loads) of material removed and no longer at risk for future failure into streams. In addition, road storage would place the road prism in a more stable condition, reducing the risk of road failures and sedimentation into streams as a result of these failures.

Table 21. Estimated reduction in road density from project activities, all action alternatives

Forest Plan Prescription Watershed	Existing Road Density (mi/mi^2)[a]	Proposed road decommissioning (mi)	Road density after project activities (mi/mi^2)[a]
Decker creek	0.5	0.0	0.5
Elk city creek	2.6	4.4	1.0
Goddard creek	1.7	4.4	1.4
Lodge creek	4.5	1.9	4.1
Lower O'Hara creek	1.6	5.7	1.2
Lower Selway river	1.5	1.4	1.5
Middle Fork Clearwater face	2.1	0.1	2.1
Swiftwater creek	2.9	3.5	2.4
Unnamed no. 8	1.2	0.0	1.2

[a]High (good) road density rating < 1 mi/mi^2; Moderate 1 to 3 mi/mi^2; and Low (poor) >3 mi/mi^2 (NOAA 1998)

In addition, to eliminating risk of road-related mass failure, road decommissioning activities would benefit water resources by eliminating the locations where roads expose and channelize subsurface flow along road surfaces causing erosion. And, decommissioning roads by recontour will increase infiltration, decreasing flashier runoff. Research shows that even revegetated, abandoned roads have levels of compaction and limited infiltration closer to the levels of currently open and drivable roads (Foltz et al 2007, Lloyd et al 2013). Increasing infiltration will allow more water storage and concentrate less runoff for storage. Where decommissioned roads are hydraulically connected to stream channels, sediment delivery would be reduced or eliminated. Implementation of the proposed road decommissioning projects would remove stream culverts, which would improve streambank stability, width to depth ratio, and floodplain connectivity at these localized sites.

During road decommissioning, short-term, localized sediment delivery is possible where channels bisect decommissioned roads (Foltz et al., 2007). Past monitoring of obliteration showed only minor amounts of sediment delivered to headwater streams, mostly in the form of suspended sediment, as indicated by increases in turbidity. Design criteria and BMPs would be applied to each of these activities to minimize increases of sediment delivery to stream channels.

Roads, Water Quality, and Climate Change

While there are still significant uncertainties with locally downscaled climate change modeling (Chen et al 2013; Salathe et al 2007), current global and regional climate models suggest that the Pacific Northwest will trend toward warmer winters with likely increases in precipitation with precipitation at lower elevations falling primarily as rain rather than snow (IPCC 2014). The changing precipitation regimes become important when considering the potential for landslides in the region. One of the most frequent triggers for road-associated landslides in the Region are winter storms that have significant snowfall followed by warmer temperatures causing the precipitation to change to rain resulting in rapid snowmelt. Hydrologists refer to this kind of storm as a “Rain-on-Snow” event. The combined precipitation and rapid snowmelt overwhelm the forest soil’s ability to allow precipitation to infiltrate, hillsides become supersaturated, and high runoff results. Roads are particularly at risk for failure during high runoff, especially roads on steep slopes where culverts do not have the capacity to transmit increased levels of runoff. Where streamflow and runoff exceeds the culvert capacity, the flow diverts out of its channel, and will usually begin flowing down the road (Gucinski et al 2001). The diverted flow can easily saturate the compacted road surface and, then the fillslope below the road. When the road fillslope is on steep ground and becomes saturated with runoff, the soils begin to lose cohesion and the slopes often fail. In the right conditions, the failure can result in a larger landslide (Furniss et al 2013). The most recent significant Rain-On-Snow event in the area occurred during the 1995-1996 winter when 300% of the average annual precipitation fell in three subsequent storms triggering landslides across the Nez Perce-Clearwater National Forest (McClelland et al 1997). A post-landslide analysis revealed that the vast majority of landslides were associated with forest roads which did not have adequate drainage (about 60% of slides). For reference only 11% of slides were associated with harvest activities-primarily ground-based harvest units, and less than 1% of landslides initiated in recently burned areas (McClelland et al 1997). As referenced above, the post landslide analysis addressed the effectiveness of decommissioned roads for limiting road-associated landslides and found road decommissioning to be 100% effective for reducing the potential for landslides during the Rain-on-Snow event. The proposed road work, including road decommissioning, helps storm proof the road system. Increasing culvert capacity for higher runoff volumes and improving road drainage along Forest Roads along with decommissioning unneeded roads ranks among the most important activities resource managers can do to increase the resiliency of forests to the impacts of climate change (Furniss et al 2013).

NEZSED Results

The NEZSED model estimates watershed-scale sediment yield based on a suite of landscape characteristics (topography, slope position, habitat type, soils) and type of management activity proposed. NEZSED is a ‘total factor’ model, where erosion coefficients based on the landscape characteristic are multiplied to sediment yield values assigned to each kind of activity (ground-based harvest, skyline harvest, type and size of road, and fire (fuels management or wildfire) and then sums the values. Sediment yield values over base (natural) conditions are compared to established standards for prescription watersheds in the Nez Perce Forest Plan Appendix A to determine if sedimentation thresholds will be exceeded as a result of proposed activities. Model output is displayed in Table 22 and Table 23.

- NEZSED results include predicted sediment yield percent over natural/base levels per Prescription Watershed for the following:
- Existing roads including roads in log haul drainages;
- Existing/Past Management with data pulled from the FACTS database and additions for the recently completed Lodge Point Sale and the completed harvest on both State and Federal lands;;
- Recent wildfire (including Johnson Bar and the 2015 Selway Fires where those fires overlap with project watersheds)
- Project activities including harvest with different levels of increase in sediment based on harvest method (ground vs. cable vs. aerial), road maintenance/recondition on Existing roads, road reconstruction, construction of temporary roads, and any fuels treatment proposed following harvest; and
- Cumulative effects model runs included activities associated for the portions of the Woodrat Salvage Harvest and proposed Clear Creek project that overlap with Prescription watersheds.

Table 22. NEZSED Model results compiled for existing condition

Prescription Watershed	Typical Year	2016			Allowed
	Average Annual Base Sediment Delivery (Tons/yr)	Estimated Current Sediment Delivery from Roads and Past Harvest Activities (Tons/yr)	Estimated Current Sediment Delivery from Wildfire (Tons/yr)	Percent Over Base from Past Actions	Percent Over Base threshold Appendix A of Forest Plan
Big Cedar Creek	207.14	0.41	0.00	0%	NA
Browns Spring Creek	90.98	4.75	0.00	5%	45
Decker Creek	68.16	0.03	0.39	1%	45
Elk City Creek	74.41	1.61	2.15	5%	70
Goddard Creek	332.92	3.91	3.32	2%	45
Hamby Creek	345.14	10.28	0.00	3%	30
Little Tinker Creek	120.76	3.16	0.00	3%	45
Lodge Creek	115.93	19.69	0.00	17%	60
Lower O'hara Creek	447.87	13.90	0.18	3%	30
Lower Selway River	477.54	17.82	0.90	4%	NA
Middle Fork Clearwater Face	801.83	13.01	0.00	2%	NA
Pine Knob Creek	86.45	18.16	0.00	21%	45
Swiftwater Creek	147.65	5.16	2.40	5%	45
Unnamed No. 8	51.50	1.02	0.01	2%	45
Lower O'hara Creek (True Watershed)	1316.35	24.18	0.18	2%	NA

Table 23. NEZSED Model results compiled for each alternative

Prescription Watershed	Alternative 2		Alternative 3		Alternative 4		Appendix A Allowed
	Percent Over from Project Activities	Cumulative Percent Over Base [a]	Percent Over from Project Activities	Cumulative Percent Over Base [a]	Percent Over from Project Activities	Cumulative Percent Over Base [a]	Percent Over Base
Big Cedar Creek	0%	0%	0%	0%	0%	0%	NA
Browns Spring Creek	9%	Litt14%	5%	10%	9%	14%	45
Decker Creek	6%	6%	4%	5%	4%	4%	45
Elk City Creek	9%	14%	4%	9%	8%	13%	70
Goddard Creek	5%	7%	2%	5%	%	7%	45
Hamby Creek	5%	8%	3%	6%	5%	8%	30
Little Tinker Creek	0%	3%	0%	3%	0%	3%	45
Lodge Creek	6%	23%	4%	21%	6%	23%	60
Lower O'hara Creek	12%	15%	4%	7%	12%	15%	30

Prescription Watershed	Alternative 2		Alternative 3		Alternative 4		Appendix A Allowed
	Percent Over from Project Activities	Cumulative Percent Over Base [a]	Percent Over from Project Activities	Cumulative Percent Over Base [a]	Percent Over from Project Activities	Cumulative Percent Over Base [a]	Percent Over Base
Lower Selway River	7%	11%	4%	8%	6%	10%	NA
Middle Fork Clearwater Face	1%	3%	1%	3%	1%	3%	NA
Pine Knob Creek	5%	26%	3%	24%	5%	26%	45
Swiftwater Creek	27%	32%	8%	13%	26%	31%	45
Unnamed No. 8	5%	7%	4%	6%	6%	8%	45
Lower O'hara Creek [b] (True Watershed)	5%	7%	3%	6%	9%	12%	

[a] Includes Existing, Wildfire, Other Projects

[b] Lower O'Hara true watershed includes the Lower O'Hara Prescription Watershed and Hamby Creek

Implementation of project design criteria, adherence to BMPs, and maintenance of PACFISH buffers would reduce potential erosion and further limit the risk of sediment reaching streams. Any sediment yield increases would be short-term (0-5 years) and beneficial uses in Selway River and the Middle Fork Clearwater River, including the Wild and Scenic River's water quality ORV, would be maintained. Project activities that could lead to a reduced sediment load to streams include erosion control (scattering of slash) on harvested hillslopes, as well as road drainage improvements and road decommissioning.

3.4.8 Cumulative Effects

Cumulative water quality impacts can result when the proposed activity (Johnson Bar Fire Salvage) are added to other past, present and reasonably foreseeable future actions that are spatially and temporarily connected. This analysis will disclose the spatial and temporal connections between the proposed action and other past, present and reasonably foreseeable future actions to identify potential areas of overlap, specifically with regard to impacts on water quality, in particular, sediment yield. In areas where project effects overlaps are identified at the subwatershed-scale, a closer look at the specific water resources impacted will help determine the significance of the cumulative impacts on water quality. In addition, the 2015 Selway Fires were considered in the cumulative effects analysis. While the 2015 Selway wildfires (Wash and Slide) occurred upstream of the Johnson Bar watersheds and predominately outside of the spatial boundaries (12 acres burned within the Johnson Bar project area and 182 acres burned in the Lower O'Hara drainage) where past, current, or reasonably foreseeable management activities would be considered to influence water quality within the Johnson Bar analysis area, the fires were large-scale natural events. The analysis examines whether the 2016 post-fire condition may result in levels of potential sedimentation to downstream areas that could degrade water quality to the point where any added effects from the proposed action would be a tipping point for water quality, causing sedimentation to exceed Forest Plan objectives, prove detrimental to water resources, or exceed levels established by the Clean Water Act.

Sediment Yield

Table 24 displays the projects identified that may affect sediment yield in the project area and includes a qualitative assessment of subwatershed-scale cumulative effects. Projects that do not affect sediment yield are not included in the table. In addition to the qualitative assessment, a quantitative analysis was completed for past, present, and the reasonable and foreseeable future harvest projects within the area.

Past Actions

At the subwatershed-scale, past activities that continue to effect water quality are primarily roads and timber harvest projects with related fuel reduction on federal, state, and private lands. Forest databases (e.g. FACTS and the Forest's Schedule of Proposed Actions) were queried to identify past activities in the same subwatersheds where the water quality impacts from the proposed project are expected.

Management activities that were excluded from more detailed analysis include mining, recreational road and trail use, pre-commercial thins older than 2 years, and grazing. Mining (primarily in-stream suction dredging) and recreational road and trail use may impact water quality at the site-scale; however, these site-scale sedimentation impacts do not overlap spatially with the proposed harvest. Further, mining activities are conducted under Forest Service permits and include BMPs designed to limit the impact of mining to water quality. Grazing activities do occur in the larger project subwatersheds and in areas where cattle concentrate near streams, grazing activities will result in sedimentation; however, the impacts of cattle grazing do not overlap spatially with the proposed project activities.

Roads: The roads in the watershed analysis area were built to support earlier forest management needs. Roads can create watershed disturbances by increasing sedimentation through mass wasting and surface erosion. Surface erosion occurs on all roads but particularly from roads that do not receive regular maintenance (Reid and Dunne 1984, Luce and Black, 1999). The road built in the past represent the existing road system. Existing roads are analyzed and included in the NEZSED model output for Existing Condition in Table 22.

Along with the existing road system, past road decommissioning occurred in the analysis area. Approximately 10 miles of Forest Service roads in the Middle Fork Clearwater River subwatershed and approximately 15 miles of Forest Service roads were decommissioned in the Goddard Creek-Selway River subwatershed since 1990. Models, including NEZSED show no ongoing sedimentation from past decommission roads after 2 years. Recent road improvement activities, including culvert upgrades and drain structure installation, have occurred in the Goddard Creek-Selway River subwatershed in 2015. These activities produced localized short-term sediment during implementation, but created long-term sediment reductions and benefits to overall channel conditions.

Timber Harvest and Previous Mechanical Fuel Reduction and Thinning Projects: Past timber harvest and mechanical treatments to thin timber stands and reduce fuels are cataloged in the FACTS database. Regeneration timber harvest has occurred on roughly 4,200 acres (16% of Forest Service managed lands) since the 1950s. Commercial thinning has occurred on 1,650 acres, or 6% of the project area, since 1970. An assessment of aerial photos shows that 'no-harvest' buffers were retained on perennial streams since the 1970s with most appearing to be a minimum of 100' wide. A total of 1,475 acres, or 35% of all regeneration harvest, occurred since PACFISH was implemented (1995) and appropriate sized buffers were retained. About 380 acres of past harvest have occurred within what is now the RHCA's. With the exception of the effects of the roads built to support the harvests, the effects of past harvest on current levels of sedimentation decline to zero as vegetation regrows, usually between 2-10 years in the project analysis area. The effects of past harvest and commercial thinning, including harvest completed in 2015 in Lodge Point and the state and private land harvest along the Selway Face are included in the model output of NEZSED in the Existing condition in Table 22.

Wildfire and Prescribed Burns: The Johnson Bar 2014 wildfire had potential to contribute to ongoing increased sedimentation into streams. In the areas where there was a high level of tree mortality, water yield increased and the increase in water yield likely resulted in higher runoff and sediment delivery to streams. The increased flows from Johnson Bar burned area could have contributed to bank instability; but aerial reconnaissance and field surveys do not show evidence that significant bank erosion has occurred. The Johnson Bar Fire Salvage Project would not add to bank stability and erosion concerns because there would be minimal project-related erosion or sedimentation to streams, and project activities were not predicted to affect water yield and magnitude of peak flows.

The sediment filtration capacity of near-channel vegetation was reduced along some streams by the 2014 fire and, to a minor extent, along O'Hara Creek from the 2015 Wash Fire, which could increase erosion and sedimentation risk. Given that most riparian areas in the project area were unburned or burned with low-severity effects, riparian buffers would continue to function as sediment filters for potential runoff from surrounding burned hillslopes. The proposed project would not add to this effect because no RHCAs would be treated.

Fire line construction from suppression efforts for the Johnson Bar fire could increase erosion and sedimentation risk, especially in areas where concentrated flow from these features could enter the stream system. However, no sediment delivery from firelines was observed after fall 2014 storms and in 2016 surveys, the areas are beginning to revegetate and no erosion has occurred. Fire lines do not overlap with salvage units.

Site visits in 2015 and 2016 show excellent understory vegetation recovery and this recovery has successfully mitigated erosion from burned areas. The effects of the 2014 wildfire and the past prescribed burning for post-harvest fuels treatment are included in the Direct/Indirect Effects section and quantitatively evaluated in the NEZSED runs for Existing Condition. The effects of the 2015 wildfires are described below under the separate heading. Where the 2015 wildfires overlapped with the analysis area for water resources, the burned areas were included in the NEZSED model output for wildfires and added to existing condition and project effects in the Cumulative Effects output.

Present Actions

Roads: There is no additional road construction proposed in the effects analysis area beyond the temporary roads proposed in the Alternatives. Routine maintenance will continue to occur on roads in the analysis area in addition to what has been proposed to support project activities. All road maintenance including road blading, drainage improvements, culvert maintenance, and surfacing follows Best Management Practices which have been shown to reduce the short-term inputs of sediment associated with maintenance activities. Long-term sedimentation from the road system in the project area would likely be reduced due to approximately 5 miles of roads being placed into storage and 12 miles recontoured, in addition the 62 miles under pre-haul or routine road maintenance will decrease road-related erosion. Restriction of haul to dry or frozen conditions on haul routes would minimize risk of sediment delivery from roads as a result of haul operations. The effects of project roads, maintenance of roads, log haul, and road decommissioning are described above, and quantitative modeling of sediment was completed in NEZSED and WEPP.

Timber Harvest: In addition to the proposed harvest in the Johnson Bar Fire area, another salvage harvest in the Woodrat Fire area is proposed within the part of the Big Smith-Middle Fork Clearwater Subwatershed (Middle Fork Clearwater Face prescription watersheds). The sedimentation potential as a result of the Woodrat Salvage is analyzed in the NEZSED output for cumulative sediment yield in the Middle Fork Face drainage.

Reasonably Foreseeable Actions

Roads: Routine maintenance will continue on roads in the analysis area following the same Best Management Practices as described above and are detailed in the Hydrology Specialist Report Appendix. Future culvert replacement projects on O'Hara Creek should reduce risk of culvert failure at these crossings and short-term impacts will be mitigated by the implementation of Best Management Practices during culvert installation.

Timber Harvest and Mechanical Thinning: There are two future harvest planned where effects will have some overlap in time and space with the hydrology effects area of Johnson Bar. These projects are Lowell WUI and Clear Creek Integrated Restoration Projects. The projects are entering the final planning and analysis phases and could begin as early as 2018. The Clear Creek Integrated Restoration effects area overlaps with the proposed log haul routes for Johnson Bar project and Lowell WUI overlaps with a portion of the Middle Fork Clearwater Face. The areas where effects from Clear Creek and Lowell WUI overlap with analysis area for Johnson Bar were included in the NEZSED model output for cumulative effects.

Table 24. Past, present, and reasonably foreseeable future projects within the Middle Fork Clearwater and Selway drainages

Subwater-shed Name	Project Name	Location	Project Type	Miles/Acres	Year(s)	Analysis Method	Effects on Water Quality
Goddard Creek	Road Reconstruction	653 Road/Lodge Creek Lodge Point Sale	Replace 5 culverts	2.2 miles	2013	Forest Monitoring and Literature reviews	Net Improvement
Goddard Creek	Road Reconstruction	286A Road/ Lodge Creek Lodge Point Sale	Replace 4 culverts	0.9 mile	2013	Forest Monitoring and Literature reviews	Net Improvement
Big Smith-Middle Fork Clearwater	Road Reconstruction	286D Road/ Lodge Creek Lodge Point Sale	Aggregate surfacing	0.2 mile	2013	Forest Monitoring and Literature reviews	Net Improvement
O'Hara Creek	Road Reconstruction	Road 651; O'Hara Creek Road	Culvert replacement; upgrade to 100 year flow	4 culverts	2015	Forest Monitoring and Literature reviews	Net Improvement
O'Hara Creek	Road Reconstruction	Upper Road 651; O'Hara Creek Road	Spot surfacing to reduce surface erosion	3 miles	2015	Forest Monitoring and Literature reviews	Net Improvement

Subwater-shed Name	Project Name	Location	Project Type	Miles/Acres	Year(s)	Analysis Method	Effects on Water Quality
O'Hara Creek	Road Reconstruction	Lower Road 651; O'Hara Creek Road	Culvert replacement; upgrade to 100 year flow	3 culverts	2017-2018	Forest Monitoring and Literature reviews	Short-term site specific sediment inputs during work, then Net Improvement
Selway Face Drainages	Selway Road, Nineteen Mile culvert and Gedney bridge repair	Road 223/Selway Road	Culvert replacement, road reconditioning	1.7 miles of road reconditioning, culvert replacement, bridge repair	2016	Forest Monitoring and Literature reviews	Short-term sediment inputs to adjacent streams during work, then Net Improvement
Rackliff, Glover, Horse, Lower Meadow, Buck Lack, Otter Creek	Wash Wildfire	South of O'Hara Creek to Lower Meadow Creek	Wildfire	35-645 acres. 12 acres in JBar project area for 95 acres in Lower O'Hara Creek.	2015	Field Review, NEZSED model for JBAR project area, WEPP model for watersheds outside project area.	Minimal within the Johnson Bar watersheds, Moderate local effects to the Lower Meadow Creek, Glover Creek, and Rackliff Creek Subwatersheds. Minimal effect to the Selway River.
Pinchot, Gedney, Rackliff	Slide Wildfire	North of Selway; Johnson Creek to Renshaw Creek	Wildfire	10,325 acres	2015	WEPP and Field Review	Minimal
Big Smith-Middle Fork Clearwater	Lodge Point Sale	Lodge Point	Stewardship sale	598 acres of commercial thinning; open 4.3 miles of old roads and decommission when done; construct 1.1 miles of new temporary roads and obliterate when done; chip/haul 2,800 tons of biomass	2013-2015	NEZSED model	Moderate
Upper Clear Creek and Big Smith-Middle Fork	Clear Creek Timber Sale	Clear Creek	Timber sale and watershed improvements	4156 acres regeneration; 4,551 acres intermediate	2015-2022	NEZSED	Moderate to High in Pine Knob Prescription Watershed

Subwater-shed Name	Project Name	Location	Project Type	Miles/Acres	Year(s)	Analysis Method	Effects on Water Quality
	Lowell Wildland -Urban Interface (WUI)	North and east of Lowell	Timber sale	160 acres	2016	Field Review	Outside of analysis area for JBAR
Glover, Lower Meadow, Horse Creeks	Wash Roadside Hazard	Road 44./Falls Point; Wash Fire area	Timber sale	91 acres; strips above or below road	2017	NEZSED and WEPP completed for the Roadside EA	Minimal and entirely outside the spatial effects area for Johnson Bar
Big Smith-Middle Fork Clearwater	Woodrat fire Salvage	West of Syringa; Woodrat Fire area	Timber sale	350 acres	2017	NEZSED	Minimal to Middle Fork, but Moderate local effects
Big Smith-Middle Fork Clearwater	101 Roadside Hazard	101/Smith Creek and Swan Creek roads	Timber sale	46 acres; strip above or below roads	2016/2017	NEZSED	Minimal in Middle Fork Face Drainages
Selway Face Drainages	Private Timber Harvest	Mouth of Selway River	Salvage/regeneration	80 acres	2014	NEZSED and WEPP and Field Review	Minimal in 2016-2017
Selway Face Drainages	Private Timber Harvest	Selway River face near Elk City Creek	Salvage	120 acres	2015-2016	NEZSED and WEPP and Field Review	Minimal in 2016-2017
Selway Face Drainages	State of Idaho Timber Harvest	South of Swiftwater Creek	Salvage/regeneration	167 acres; 3 miles permanent roads	2015	NEZSED and WEPP and Field Review	Minimal in 2016-2017

Quantitative modeling for Cumulative Effects

NEZSED provides one of the only true cumulative effects model for forest management activities (i.e., harvest, road building, fire) (Hyde et al 2006). In addition, because NEZSED is tied Forest Plan objectives, it provides an appropriate way to contextualize potential impacts to water resources, i.e., percent sediment yield over base compared to watershed guidelines. The past/completed projects were included in the NEZSED model and included in Existing Condition output. Existing condition calculations include the recently completed Lodge Point harvest, all recently completed state and private clearcuts, wildfires, and all past harvest and burning projects within the spatial and temporal boundaries for analysis. For cumulative effects, the projects added to NEZSED runs included the Woodrat Salvage project (roadside work and the area salvage) and Clear Creek. The other concurrent harvest projects such as Wash Roadside Hazard Tree Removal were outside the spatial boundaries considered for harvest effects.

Table 23 summarizes the cumulative watershed impact to sediment yield of all the projects detailed above. The cumulative impacts of the combined projects do not result in any watershed exceeding Forest Plan guidelines for sediment yield and will not create impairment of water quality within the effects analysis boundary.

In addition to NEZSED, the WEPP Watershed Interface was used to estimate erosion from the Selway Face drainages where State and private clearcuts were completed in 2015. The conditions of the model were run assuming 2016 condition (post-harvest). Both the state and private harvests used helicopter logging, which eliminated the need to build new temporary roads and skid trails, greatly reducing potential sedimentation. Ground cover is an important control on WEPP estimates for erosion (Elliot 2000) and the 2016 post-fire/post-harvest recovery of ground cover is over 90% in these areas; consequently, WEPP does not predict a measurable increase in erosion in 2016 as a result of harvest (ground cover is higher in 2016 than in 2014 despite the clearcuts because of two growing seasons, which allowed grasses and forbs to revegetate following the fire and harvest). However, given the steep slopes and soil types with a high potential for erosion, WEPP does predict erosion between 2 and 8 tons/acre/year depending on slope and riparian buffer width from the disturbed hillslopes. Both NEZSED and WEPP show that the amount of erosion from the proposed project activities combined with the state and private harvest will not increase sediment levels in streams beyond thresholds that will impair water quality at either the site-scale or larger subwatershed scale. Indeed, both aerial reconnaissance and ground field reviews confirm that there is no evidence of significant erosion (from gullies or rills) into riparian areas from the state and private harvest (USDA, NPC, 2016).

2015 Selway Fires: Slide and Wash

The 2015 Selway Fires burned primarily outside of the spatial boundaries considered for cumulative effects. Where the Wash Fire overlapped with project watersheds (95 acres of the O'Hara Creek Watershed), the acres of burned area were added to the Existing condition runs for NEZSED. Given the scale of the 2015 fires, it is important to examine whether the level of increased erosion resulting from wildfire has been or will be enough to change existing condition in the Selway or Middle Fork Clearwater to a level where the predicted increases of sediment from the Johnson Bar salvage activities would cause the water quality of the Selway or Middle Fork Clearwater to exceed State/Federal water quality standards.

The Woodrat Fire was also considered for potential effects to water quality; however, Woodrat was a smaller fire with significantly less high severity burns and the effects of this fire in some areas are beyond the spatial boundary of the effects analysis (downstream in the Middle Fork Clearwater). Where Woodrat did burn in the Middle Fork Clearwater Face drainages, the impacts in 2016 and beyond are smaller and will be at site-scale that is spatially disconnected from project activities. However, the effects of proposed salvage harvest in Woodrat are included in the NEZSED cumulative effects.

The 2015 Forest BAER assessments for the Selway Fires predicted a likely significant increase in erosion from the burned hillslopes, especially in the higher severity burn locations of the Slide and Wash Fires. The USGS Preliminary Hazard Assessment for the two fire areas in 2015 showed that there were subwatersheds in the Nineteen Mile and the Glover Creek drainages within in the Slide Fire Perimeter and subwatersheds of the Meadow Creek drainage in the Wash Fire Perimeter that had 20-40% probabilities of debris flows. All of the subwatersheds in the Slide Fire are within the Inventoried Roadless Area and only a one road goes through 2 of the Wash subwatersheds modeled as having 20%-40% probability of post-fire debris flow. The USGS predicted a less than 20% probability of debris flows in all other watersheds within the 2015 fire perimeters. Given the low to moderate probabilities of post-fire debris flows presented for the Slide and Wash Fires Post Fire Debris flows and one year of revegetation, the probability of debris flows/mass erosion decreases further in 2016. In fact, the methods used by the USGS (Cannon et al 2010) state that the predictive power and relevance of the probability model are invalidated after hillslope recovery (revegetation). Given the high precipitation and favorable growing season in the Selway, the level of vegetative recovery in both the Slide and Wash Fires have reached levels of recovery where the Cannon et al (2010) model is no longer accurate.

Aerial reconnaissance flights over the Slide and Wash fire areas in August of 2016, did not show any signs of mass erosion in the Slide Fire area. The Slide Fire shows near complete recovery of understory grasses and forbs even in the areas classified as having the highest severity burns. Field surveys along burned trails show sites of local erosion, but almost no erosion at the level where there was direct delivery from trails into streams, in part because riparian areas remain mostly unburned in the Slide Fire area and still provide an effective filter, preventing hillslope erosion from reaching the streams. Consequently, there seems to be very limited, if any potential for sediment from the Slide Fire to reach the Selway. Any sedimentation that does occur into the Selway will be minimal and likely immeasurable from background levels in the 2015 burned areas.

As with the Slide Fire, aerial reconnaissance of the entire Wash Fire area was completed in August of 2016 and field visits in June and July 2016. The Wash Fire burned with higher severity than the Slide Fire, particularly in the Meadow Creek drainage. Though even in these areas which were classified as having the highest soil burn severity recovery of ground vegetation is dramatic. The Forest Service’s Remote Sensing Applications Center, who process the remote sensing images to get burn severity maps, completed a 2016 the data acquisition to compare burn severity from 2015 in late September to the burn severity values one year later in September of 2016. After validation with field visits, the change in burn severity for the Wash Fire shows there has been a significant reduction in area that is classified as severely burned and recovery of ground vegetative cover. Table 25 compares the Wash Fire soil burn severity classifications made during the 2015 BAER Team assessments with the values derived from the 2016 remote sensing data to provide an indication of the recovery that occurred in one year.

Table 25. Soil burn severity classifications derived from 2 satellite images (Sept. of 2015, 2016) from the Wash fire

Soil Burn Severity	2015		2016	
	Acres	%	Acres	%
High	8,109	23%	551	2%
Moderate	4,279	12%	12,227	36%
Low	21,934	63%	21,934	79%
Unburned	390	1%	N/A	N/A

Figure 11 through Figure 18 show photos taken immediately after the 2015 events and conditions from the summer of 2016. There are a few areas where bare soil remains, but predominately hillslope grasses, forbs, and shrubs show a strong recovery with 80-100% ground cover.

Figure 11. Wash Fire. Highest severity burn area along the Meadow Creek face drainages in September 2015 immediately after fire.

Figure 12. Wash Fire. Highest severity burn area along the Meadow Creek face drainages in August 2016.


Figure 13. Wash Fire. Highest severity burn area along the Meadow Creek face drainages near the top Indian Hill Road in September 2015 immediately after fire.

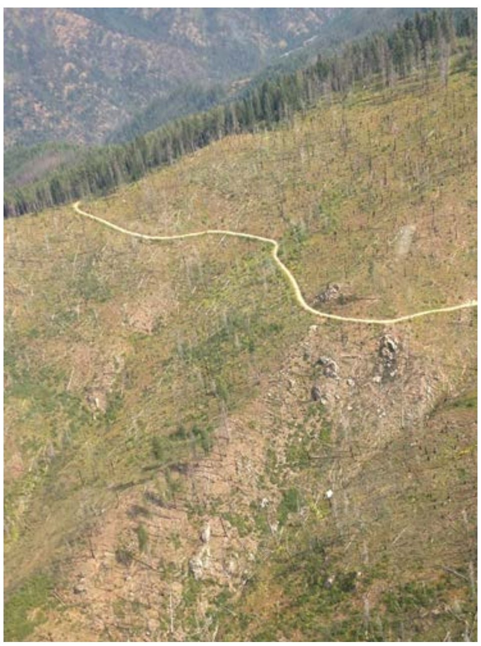
Figure 14. Wash Fire. Highest severity burn area along the Meadow Creek face drainages near the top Indian Hill Road in August 2016.


Figure 15. Wash Fire. Highest severity burn area along the Meadow Creek face drainages near Indian Hill Lookout, just below Indian Hill Road in September 2015 immediately after fire


Figure 16. Wash Fire. Highest severity burn area along the Meadow Creek face drainages near Indian Hill Lookout, just below Indian Hill Road in July 2016

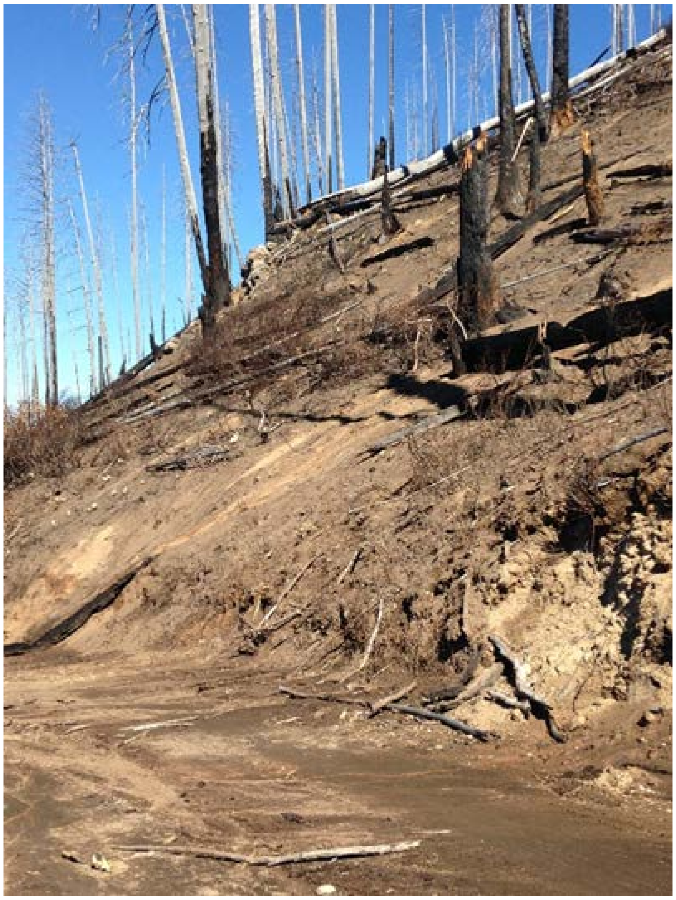

Figure 17. Wash Fire. Highest severity burn area along the Meadow Creek face drainages near Indian Hill Lookout, just above Indian Hill Road in September 2015 immediately after fire

Figure 18. Wash Fire. Highest severity burn area along the Meadow Creek face drainages near Indian Hill Lookout, just above Indian Hill Road in July 2016

The recovery of ground vegetation significantly reduces the potential for surface erosion (Table 26) from the potential erosion predicted in the 2015 BAER reports. While the risk of mass erosion events is not 0 in any parts of the Wash Fire, the area is naturally prone to mass erosion with or without fire, the chance of mass erosion caused by fire is dramatically reduced. The aerial reconnaissance showed several small landslides in the Meadow Creek drainage. There was one landslide not in the burn area and classified as natural. There were several failures evident off the Falls Point road (FSR#443), one of the road failures was likely the result of increased flow from the 2015 fire. The aerial reconnaissance did show fire-related erosion within the headwater tributaries along the Meadow Face which likely did increase sedimentation into Meadow Creek during 2015 and 2016. These incidences of fire-related erosion will likely continue into the next year; however, the potential for delivery into Meadow Creek will reduce as vegetative recovery continues both in the headwaters and along Meadow Creek. There is no evidence that the sedimentation into Meadow Creek, or sedimentation from other parts of the fire area significantly altered downstream water quality in the Selway.

Table 26. Comparison of WEPP (ERMiT) modeled erosion the high severity burn areas in the 2015 BAER report to the update predictions with 2016 site conditions

Burn Severity	Erosion Rates (ton/acre)	Erosion (ton/acre)	Erosion (ton/acre)
	BAER Predicted over background rates in 2015	BAER (2015) Model Output for Year 2016 (predicted over background)	WEPP Output Updates with 2016 Field Observed Site Conditions
Unburned	0	0	0
Low	11.61	7.66	0
Moderate	12.38	9.07	0
High	16.29	10.68	0.55

While the inputs of sediment will likely continue from the burned areas, the effects will be local and site-specific; spatially disconnected from the Johnson Bar area of effect for water quality.

3.4.8.1 Irreversible and Irretrievable Commitment of Resources

There are no effects to watershed resources in the Selway or Middle Fork Clearwater River basins from this project that are considered to be irreversible or irretrievable because the amount of sediment expected from the proposed project would remain below Forest Plan standards and water quality objectives. The water quality of the streams, watersheds, and streams downstream of project activities will be maintained during and after the proposed Johnson Bar harvests and cumulative effects of other projects and wildfires. The proposed project would improve sediment conditions over the long-term (>2 years) as it reduces road density, removed roads from landslide prone areas, and improves road drainage to divert road related sediment away from streams.

3.5 Fisheries

This section summarizes updated existing condition information for aquatic habitats and fish species within the Johnson Bar Fire Salvage project area. It also discusses the potential direct, indirect, and cumulative effects of the alternatives on those habitats and species.

This report provides a variety of new information not displayed in the Johnson Bar FEIS. Specifically it focuses on the effects of roads and stream crossings, as they have the highest probability of contributing sediment to streams. In addition it should be noted that for cumulative effects, the Idaho Dept. of Lands did not build 3 miles of permanent road (with 13 stream crossings) as part of their fire salvage project in 2015. These miles were assessed in the FEIS. Since no roads were built, there is a considerable reduction in potential effects to aquatic resources which subsequently changed the Fisheries cumulative effects analysis for the project.

3.5.1 Analysis Area

The Johnson Bar Salvage Project area is about 26,800 in size and is located within the Lower Selway and Middle Fork Clearwater River subbasins. The smaller subwatersheds (HUC12s) within the project area include: Big Smith Creek-Middle Fork Clearwater River, Goddard Creek-Selway and O'Hara Creeks.

The Nez Perce National Forest Plan (1987) Appendix A further subdivided these subwatersheds into smaller prescription watersheds; each with specific fishery/water quality objectives. The prescription watersheds include: Lodge, Unnamed No. 8, Middle Fork Clearwater Face, Decker, Swiftwater, Elk City, Goddard, Lower Selway and Lower O'Hara Creeks.

The direct and indirect effects of the Johnson Bar Salvage Project are assessed at the Forest Plan prescription watershed scales and cumulative effects are assessed at the subwatershed (HUC12) scale. These scales were selected because effects from the proposed actions would not be distinguishable at scales larger than these.

3.5.2 Regulatory Framework

Nez Perce Forest Plan direction and all Federal and State laws and regulations applicable to watershed and fisheries resources would be applied to the Johnson Bar project, including the Clean Water Act, Endangered Species Act and the Idaho Forest Practices Act.

3.5.2.1 Nez Perce National Forest Plan

Forest standards for water resources are found in the Nez Perce National Forest Plan on pages II-18 through II-22. The Plan directs that forest management activities minimize sediment input to streams, meet beneficial uses, apply best management practices to ensure water quality standards are met or exceeded, and manage all water under the designated standards found in Forest Plan Appendix A. Where water quality objectives are not currently being met in prescription watersheds, an upward trend must be demonstrated. The analysis relies on past and current data as well as both active and passive restoration activities that have occurred in the watersheds as described in the Implementation Guide to Appendix A of the Nez Perce Forest Plan (Conroy and Thompson, 2011).

The Forest Plan was amended in 1995, following a joint decision (commonly called PACFISH) by the U.S. Forest Service and Bureau of Land Management for managing anadromous fish-producing watersheds on Federal lands, including streams within the project area. The standards and guides from PACFISH would be applied to the project.

The interim direction provided by PACFISH identifies and defines Riparian Habitat Conservation Areas (RHCAs), establishes Riparian Management Objectives (RMOs), and applies standards and guidelines to RHCAs to meet the RMOs. PACFISH RHCAs include those areas within 300 feet of fish bearing streams, within 150 feet of non-fish bearing perennial streams, and 100 feet on intermittent streams and wetlands of 1 acre or less. RHCA widths exceed Idaho state Forest Practices Act standards. PACFISH directs that all management activities must be designed to have no adverse effect to the designated Riparian Management Objectives (RMOs) which are large instream woody material, stream temperature, width to depth ratios, bank stability, and pool frequency.

Compliance:
Water Quality Objectives: All action alternatives comply with the Forest Plan Water Quality Objectives and the upward trend requirement. FISHED modeling indicates no measurable changes in cobble embeddedness, summer or winter rearing capacity in any of the prescription watersheds. In addition, road decommissioning, improvement and maintenance activities would reduce potential sediment input and allow streams to continue to trend toward meeting desired conditions for cobble embeddedness, summer rearing and winter rearing capacity.

Nez Perce Forest Plan Upward Trend: The upward trend for the Johnson Bar prescription watersheds are primarily a result of riparian areas that are mostly intact with minimal effects from the fire or from land management activities. Also the majority of roads are graveled and positioned to have minimal effects on streams. The Forest Plan Appendix A Implementation Guide (Conroy and Thompson 2011) states “It was assumed in the Forest Plan that implementation of instream restoration and other watershed restoration activities would result in an upward trend in carrying capacity. Where these activities have been implemented, it could be stated that an upward trend in the habitat conditions has been accomplished.” Watershed restoration activities in the form of road improvement, culvert replacement and road decommissioning have been, and continue to be implemented in the project area. These have contributed to the upward trend in fish habitat carrying capacity throughout the area.

Although short term impacts to modeled sediment yield are expected with the implementation of the Johnson Bar Fire Salvage project, they are less than those that could occur under the No Action alternative which does not address road-related sediment issues beyond what projects have already been completed. Short term (<5 years) negative impacts with long term beneficial impacts to sediment yield are expected as a result of the road improvement and road decommissioning activities. Modeled sediment yield using NEZSED shows an increase in the prescription watersheds but all remain well below Forest Plan water quality objectives (see Hydrology section). Modeling in FISHSED shows increases in cobble embeddedness of 0-3% over post-fire conditions. This is below the 10% where changes might occur based on the model documentation (Stowell, 1983). The existing upward trends would continue primarily as a result of the removal of 30% of the stream crossing culverts within the project area as well as PACFISH buffer retention and BMP implementation, road improvement and continued maintenance work.

In summary, the Johnson Bar Project would have minimal short term negative effects associated with modeled sediment increases and culvert removal/replacements but would have a long term positive effect associated with road improvements and decommissioning. The combined road-related projects are expected to maintain an upward trend through reduced sediment delivery and runoff from roads to streams and aquatic habitats throughout the watershed. Reduced chronic sediment delivery is expected to allow for a continued upward trend for reduced cobble embeddedness levels and improved fish habitat carrying capacity over time.

PACFISH (Forest Plan Amendment #20*):* The project complies with PACFISH in that the project would not retard the attainment of Riparian Management Objectives for bank stability, width to depth ratio, instream large woody debris, pool frequency, or water temperature. Project activities would allow for improvement in large wood, pool frequency, and water temperature overtime as no riparian areas would be harvested. Bank stability would be maintained throughout the drainage as a result of RHCA retention and limited increases in modeled sediment yield. Road decommissioning and culvert replacements would help to maintain bank stability over the long term by eliminating or greatly reducing the potential for future crossing failures. Adding cross drain culverts would reduce the potential amount of sediment reaching streams from ditchlines. The project complies with PACFISH standards and guidelines for timber harvest and road-related activities by not conducting timber harvest in RHCAs (Guideline TM-1), minimizing roads in RHCAs (RF-2b), reconstructing road and drainage features to control sediment delivery (RF-3a), obliterating roads not needed for future management (RF-3c), and improving culverts at stream crossings to accommodate a 100-year flow event (RF-4). It also implements watershed restoration that promotes the long-term ecological integrity of ecosystems (WR-1) and contributes to the attainment of RMOs (FW-1).

3.5.2.2 Endangered Species Act

The US Fish and Wildlife Service species list accessed on September 15, 2016 (https://ecos.fws.gov/ipac/) identified bull trout as the only threatened resident fish species under the ESA within Idaho. The NOAA Fisheries list was accessed on the same date and identified Snake River steelhead trout and fall chinook as threatened under ESA (http://www.nmfs.noaa.gov/pr/pdfs/species/esa_table.pdf) Essential Fish Habitat (EFH) for salmon also occurs within the project area and must be considered. Consultation with the two agencies is required for projects affecting these species. The project would be designed to have no long term adverse effects on listed species or their habitat.

Compliance: Listed steelhead trout are known to occur in most project area streams, although distribution is limited in Lodge, Decker, Swiftwater, and Elk City Creeks due to small stream size and higher than preferred stream gradients. There are a total of 20 miles of designated critical habitat within Goddard and O'Hara Creeks and the mainstems of the Selway and Middle Fork Clearwater Rivers. There are 15 miles of designated critical habitat for bull trout in O'Hara Creek and the two mainstem rivers. Fall chinook critical habitat (11 miles) occurs only within the Selway and Middle Fork Clearwater River mainstems. Essential fish habitat for salmon (EFH) occurs in the lower 4 miles of O'Hara Creek and in the two mainstem rivers. A detailed analysis of effects to listed fish species (steelhead and bull trout, fall Chinook salmon, and essential fish habitat for salmon) was completed and can be found in the Johnson Bar Fire Salvage Project Biological Assessment (project file).

The retention of RHCAs adjacent to timber harvest units are designed to protect both the fish and their designated critical habitat through the retention of all vegetation as previously discussed. No effects to listed species or their habitat are expected from timber harvest or temporary road construction based on local monitoring efforts.

Potential effects to listed fish species or their habitat could result from the addition of sediment into streams from culvert removals/replacements, road improvement, and log haul. Culvert removals/replacements would add pulses of sediment to streams in the short term while culverts are removed/replaced and runoff occurs from ground disturbed areas. They would add about 280 pounds of sediment to streams. These levels are not likely to be detectable as critical habitat for listed species occurs a minimum of 1,000 feet from the activities. The greatest distance is 3 miles. Removals/replacements are expected to reduce sediment delivery in the long terms (>5 years).

Road reconditioning, reconstruction, and dust abatement are expected to reduce existing road sediment sources and sediment delivery, especially during log hauling activities. Road blading prior to dust abatement would initially create newly disturbed roadbeds and portions of some ditches would be cleaned thus increasing potential sediment delivery to ditches. Where cross drains or outsloped roads occur, the sediment would not be delivered to streams. Where they are not disconnected, delivery could occur.

There are 75 live stream crossings on graveled or native surfaced haul routes. About 20 sites are known to have cross drains within 150'and the remainder are unknown. This results in potential sediment being delivered at 55 crossings, of which most cross small (<24") streams and carry relatively low volumes of water. All but 2.4 miles of the haul routes are graveled and all ditchlines are well vegetated which reduces the potential for sediment input from haul. About 30 of the crossings occur in the O'Hara Creek drainage and 2 occur in the headwaters of Goddard Creek, both of which have designated critical habitat. There are 18 crossings in Lodge Creek, 10 in Swiftwater Creek, and 2 in Elk City Creek where no critical habitat exists. The crossings are also a minimum of 2.5 miles away from known steelhead distribution. Steelhead densities in Lodge, Swiftwater and Elk City Creeks are very low therefore potential sediment effects to them are also very low. The greatest potential for delivery to steelhead trout and their habitat from log haul is in O'Hara Creek due to the number of crossings and proximity of Road 651 to the stream. The ESA determination is therefore "***May affect, likely to adversely affect***" for steelhead and their critical habitat. Effects would be minimized through the use of design features and BMPs including graveling, dust abatement, and minimizing log haul during wet periods.

The effects to bull trout and their critical habitat would be similar to those discussed for steelhead trout; however bull trout are not known to spawn in O'Hara Creek, or the Selway or Middle Fork Clearwater Rivers. These streams are used as feeding, migratory or overwintering habitat when stream temperatures are favorable. Effects to bull trout are expected to negligible and short term due to their limited occupancy of areas streams during expected log haul (July through September). The ESA determination for bull trout and their critical habitat is "***May affect, not likely to adversely affect***". Effects would be minimized through the use of design features and BMPs including graveling, dust abatement, and minimizing log haul during wet periods.

The effects to fall chinook and their habitat in the Selway and Middle Fork Clearwater Rivers are not expected to be discernable due to their distance away from proposed activities, the limited amount of sediment likely to be generated by the activities, and the large sediment transport capabilities of the two rivers. The resulting ESA determination for fall Chinook salmon and their critical habitat is "***May affect, not likely to adversely affect***". Effects would be minimized through the use of design features and BMPs including graveling, dust abatement, and minimizing log haul during wet periods.

The effects to essential fish habitat for chinook and coho salmon are the same as those discussed for steelhead trout in O'Hara Creek, the Selway and Middle Fork Clearwater Rivers. Salmon habitat occurs in the same reaches as steelhead habitat in these streams. Spring Chinook salmon are known to spawn and rear in the streams. Coho salmon have not been observed. The ESA determination for essential fish habitat is "***May affect, likely to adversely affect***" as sediment may be deposited in O'Hara Creek from log haul activities. It would not be discernable in the Selway and Middle Fork Clearwater Rivers. Effects would be minimized through the use of design features and BMPs including graveling, dust abatement, and minimizing haul during wet periods.

Consistency with 1998 Forest Plan Biological Opinion for Steelhead: In 1997, the U.S. Forest Service and Bureau of Land Management completed a Biological Assessment (BA) relevant to all long-range management plans as amended by PACFISH, across the Columbia River Basin range for steelhead trout that were proposed for listing under the ESA. Included in the BA were nine recommended actions to reduce and avoid adverse effects to steelhead; one of which added special management provisions for the Selway, Middle Fork Salmon, and South Fork Salmon Rivers. These provisions included additional protective measures above and beyond those in PACFISH because these steelhead populations were considered critical to the conservation and recovery of the Snake River Basin steelhead Distinct Population Segment. In 1998, ESA section 7 consultation in the form of a Biological Opinion (BiOp) on long-range management plans/forest plans was completed with these provisions included as part of the proposed action. The provisions from the BA that pertain to the Johnson Bar Fire Salvage project include:

- Build new roads only to replace existing roads in RHCAs, or directly repair human-caused damage to steelhead habitat in streams;
- Do not widen roads by increasing cut and fill slopes in order to accommodate more traffic and/or larger vehicles than can presently use the road;
- Do not open closed and revegetated roads for management purposes unless necessary to repair human-caused damage to steelhead habitat;
- Use only existing open roads, without construction of new landings;
- Only use timber harvest methods (such as helicopters, horses, etc.) that result in low levels of ground disturbance or that avoid adverse effects to steelhead.

The 1998 Forest Plan BiOp was a refinement of the 1995 BiOp for PACFISH in which shortcomings of Forest Plans/LRMPs were identified including the inconsistent application of PACFISH buffers and timber removal within the buffers. They also noted that road rehabilitation and obliteration, and other restoration activities have been inadequately planned, funded and monitored thus reducing the ability to improve baseline conditions for listed fish. These concerns have been incorporated into projects and have been funded across the Nez Perce Forest, including the Johnson Bar Fire Salvage Project, since 1998. The fire salvage project would implement full PACFISH buffers and would conduct road related activities that are expected to lead to improvements in steelhead trout habitat. This in turn is expected to meet the objectives of the BiOp in that it implements projects that "directly repair human-caused damage to steelhead habitat in streams" (BiOp, pg.85), particularly those related to the existing road system.

The Level 1 team (NMFS, USFWS, USFS, BLM) responsible for consultation on ESA listed species had lengthy discussions in 2013 about potential effects from the Iron Mountain Vegetation Management Project in relation to the additional 9 items listed in the 1998 Forest Plan BiOp. The Iron Mountain project, like the Johnson Bar project, lies within the Lower Selway River drainage and conducts timber harvest operations. As a result of these discussions, it was agreed that projects within the Selway Basin would go through informal or formal consultation depending on the effects determinations made by the Forest to determine if individual projects met the objectives of the 1998 Forest Plan BiOp. The overall intent and direction of the BiOp was to avoid management actions that would have adverse effects to steelhead or their critical habitat.

The Johnson Bar Project has been discussed on multiple occasions at Level 1 since December, 2014. This resulted in the Forest and NMFS worked cooperatively to shape project actions that avoid adverse effects to steelhead and steelhead critical habitat from harvest activities. The general themes related to harvest include: emphasizing low impact harvest methods (e.g., with over 90% helicopter and skyline yarding); limiting temporary road construction to low gradient ridge top locations and prioritizing existing roads for landings; ensuring all temporary roads, swing trails, and areas cleared for landings will be decommissioned after use; and ensuring all temporary roads, landings, swing trails, and skyline corridors were located and designed to be hydrologically disconnected from the stream network in order to avoid mechanisms for sediment delivery to streams. They also include PACFISH buffer retention on all streams and landslide prone areas adjacent to timber harvest units. All design features can be found on pages 34-42 of the FEIS.

Design Feature Effectiveness: The 1998 Forest Plan BiOp states, "it is acknowledged that there are limitations to the best available science and that these limitations play an important role in tactual effects to steelhead from management actions. Mitigation measures are intended to provide risk avoidance until such time as better scientific information is available" (BiOp pg. 84). New scientific information on the effectiveness of design features has become available since 1998, including PIBO (PACFISH/INFISH Biological Opinion) and local BMP monitoring.

Preliminary monitoring results from PIBO monitoring across the Upper Columbia River Basin indicate improving trends in pool depth, large wood frequency, bank stability, percent fines and percent undercut banks in reference sites. In managed sites positive trends in pool depth, wood frequency, percent undercut banks, bank stability and bank angle were observed. Negative trends were observed in percent pools in both reference and managed sites. There was no significant trend in percent fines at managed sites in earlier summaries (USDA Forest Service 2012) however declining trends in percent fines were noted more recently (USDA Forest Service, 2016, unpublished data).

Local BMP monitoring/audits of timber sales on the Clearwater National Forest has been occurring since 1990. Between 1990 and 2008, the Forest had BMP implementation and effectiveness rates of 97% or greater (USDA, 2009). These reports can be found on the web at: http://www.fs.usda.gov/detail/nezperceclearwater/landmanagement/planning/?cid=stelprdb5408439. The same BMPs would be applied to the Johnson Bar Project and are expected to have similar results since the project occurs on similar landtypes, soils, forest types, and stream types as those that were monitored.

Other local monitoring includes a post-timber harvest and burning field review of 23 miles of PACFISH buffers and 5.5 miles of temporary road. These were conducted on the Lochsa District in 2014 (USDA Nez Perce-Clearwater Forest, 2016). The results showed no evidence of sediment moving from harvest units into the buffers or sediment moving from temporary roads into harvest units or the buffers. The thick vegetation that makes up buffers provided an excellent, virtually impenetrable, filtering source for overland sediment flow. The downed woody debris left within the harvest units also provided structures that captured sediment and slowed or stopped its movement down the slope. Similar results are expected with the Johnson Bar project, especially given the 85% of the buffers were unburned or burned with low severity. The project area is very similar in landtypes, soils, and forest types as those found in the Pete

King and Lolo Creek drainages where monitoring occurred. Field reviews in 2016 of state and private timber harvest resulting from the Johnson Bar Fire showed no evidence of sediment moving from the buffers to project area streams.

Other studies have shown that no-harvest buffers of 100'- 150' adjacent to timber sales are adequate in protecting the riparian vegetation necessary to maintain natural stream temperature and wood levels (Anderson and Poage 2014; Ott et al 2005; Lee et al 2004; Sridhar 2004; FEMAT 1993). PACFISH buffers surpass these guides on fish bearing streams and meet the guides on non-fish bearing and intermittent streams.

The design features above are expected to minimize the effects to streams from harvest activities and meet the objectives of the 1998 BiOp based on monitoring. However, a Likely to Adversely to Affect determination for listed steelhead and their habitat was made due to the short-term sediment effects specifically associated with the log haul on Road 651; and road improvement, storage and decommissioning portions of the project. As a result, the Forest pursued formal consultation. Design features associated with road related work are expected to minimize potential effects to steelhead. These include: the installation of cross drain culverts, road surfacing, dust abatement, and practices to reduce sediment delivery during road decommissioning, culvert removal and culvert replacements. The effectiveness of the design features associated with roads was previously discussed above. Alternative 3 represents the alternative that most closely follows the BiOp if read literally. The determination for effects on listed steelhead would be no different for this alternative compared to Alternatives 2 and 4 because it conducts the same activities that are the basis for the adverse effects determination (road improvement, road decommissioning, and log haul on Road 651).

In summary, project related actions are expected to have a minimal adverse effects to listed steelhead or their critical habitat because of the following:

- Timber harvest units occur a minimum of 0.1 miles from steelhead or their designated critical habitat in the Selway River and Goddard Creek and 0.2 miles away from O'Hara Creek. The harvest units closest to these streams would be helicopter logged which meets the objectives of the BiOp. Due to the distance between the harvest units and occupied steelhead habitat, and based on recent buffer monitoring, no sediment is expected to affect steelhead or their designated critical habitat from timber harvest.
- The amount of sediment created during road and culvert work would be discountable downstream where steelhead occur. This is because of long distances between the activities and fish or their habitat, as well implementation of design features that minimize sediment production and the potential for it to reach streams. Their effectiveness is based on local monitoring and recent science.
- Log hauling is not specifically addressed in the 1998 BiOp; however it has the greatest potential to affect steelhead and their habitat in O'Hara Creek and is the basis for the adverse effect determination for the project. Design features, specifically dust abatement and road use restrictions, and BMP implementation are expected to minimize the potential effects of log haul to steelhead.
- Normal road maintenance, road improvement and road decommissioning activities would reduce sediment delivery to streams in the long term by improving drainage. This would result in long-term beneficial effects to steelhead and their critical habitat.

The project is expected to meet the objectives of the 1998 Forest Plan Biological Opinion for Steelhead based on the above information. The Forest is also committed to using the best available science in order to conduct projects that lead to the improvement of aquatic habitats that minimize effects to aquatic systems, listed fish species and their habitat.

3.5.2.3 Sensitive Species

Since the Nez Perce Forest Plan was published in 1987, the Regional Forester has approved an updated sensitive species list for the Forest (June, 2008). The list can be found at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5366363.pdf. This list includes four fish species including westslope cutthroat trout, interior redband trout, Snake River spring Chinook salmon, and Pacific lamprey. The western pearlshell mussel was added in 2010. A Biological Evaluation is required to determine the effects of the project on these species.

Compliance: There would be potential effects to westslope cutthroat trout and spring chinook as a result of road improvement, log haul and decommissioning activities. The effects are similar to those discussed for steelhead. The project may therefore impact individuals, but would not lead to their listing under ESA. This is due to the short term increase in sediment as modeled by NEZSED and temporary increases in suspended sediment associated with log haul. The project would have long term beneficial effects to these species from reduced road-related sediment input to streams.

Pacific lamprey or pearlshell mussels are not known to occur in project area streams but are likely to occur in the Selway and Middle Fork Clearwater Rivers. Suitable habitat for both species occurs in O'Hara Creek and as a result, log haul on Road 651 may impact individuals but is not likely to lead to their listing under ESA as increases in sediment are likely to be short term. BMP implementation is expected to minimize sediment impacts to O'Hara Creek.

3.5.2.4 Idaho Forest Practices Act

Regulates forest practices on all land ownerships in Idaho. Forest Practices on national forest lands must adhere to the rules pertaining to the Act (IDAPA 20.02.01). The rules are also incorporated as Best Management Practices (BMPs) in the Idaho Water Quality Standards.

3.5.2.5 Wild and Scenic Rivers Outstanding Remarkable Value

The Selway River Resource Assessment (2002) states: "The Selway River is renowned both regionally and nationally as an important producer of resident and anadromous fish species. The Selway River provides habitat for spring Chinook salmon, steelhead trout, bull trout, westslope cutthroat trout, steelhead, and mountain whitefish. Non-game species known or expected to occur include mottled, torrent, and shorthead sculpin, redside shiner, speckled and longnose dace, largescale sucker, northern pike minnow, and Pacific lamprey. Historically, anecdotal accounts suggest the presence of a large, mainstem spawning Chinook salmon in the Selway River below Selway Falls.

> … The Selway River and its tributaries provide crucial anadromous fish spawning and rearing habitat for federally listed threatened species including steelhead trout and bull trout. The river also functions as an important migration corridor for both anadromous and fluvial fish. The Selway subbasin is considered a stronghold subbasin for spring Chinook salmon, steelhead trout, bull trout, and westslope cutthroat trout.
>
> …The Selway River and its tributaries play a vital role in Forest Service management of sensitive, threatened, and endangered fish species. Forest Plans for the Nez Perce and Clearwater National Forests specify that it is Forest Service policy to maintain the anadromous fish runs and the native trout fishery and to perpetuate endangered species.

> It is also the goal of the Forest Service to achieve optimum levels of fish production by maintaining high-quality habitat in existing high-quality streams. The Lochsa/Selway/Middle Fork Clearwater system is important to the entire Columbia basin as it offers some of the last remaining uninterrupted habitat for anadromous and resident populations of listed species, providing relatively contiguous distribution of populations and suitable habitat. Contiguous habitat is necessary so that the biological needs of the species can be met."

The report summarizes that the presence of listed fish species and important native populations, as well as high quality habitat and diversity of species, all contribute to the determination that fish are an "outstandingly remarkable value" of the Selway River.

Effects to the Fisheries ORV: The action alternatives are consistent with the Wild and Scenic Rivers Act as they would have negligible effects on the Selway and Middle Fork Clearwater Rivers. The fisheries outstanding remarkable values would be protected through design features and BMP implementation as previously discussed. Road decommissioning and improvement activities would maintain the fisheries values throughout project area streams, both inside and outside of the designated Wild and Scenic River corridor.

3.5.3 Analysis Methodology

Past and recent stream habitat surveys from various years (between 1989 and 2014) were used to assess stream conditions and also determine if instream conditions meet Forest Plan direction. Habitat surveys were conducted on Lodge (1989), Decker (1989), Swiftwater (2014), Goddard (1989) and O'Hara Creeks (1989). No habitat information is available for Elk City, Unnamed No.8, or the Middle Fork Clearwater Face drainages as they are small and have little or no fish-bearing stream miles. Sediment sampling and some fish sampling was conducted in Lodge, Swiftwater, Elk City, Goddard and O'Hara Creeks between 2010 and 2015. Recent field reviews (2016) were also conducted to evaluate general stream, road, and culvert conditions including areas in Elk City and Swiftwater Creeks that were harvested on state and private lands in 2015. In addition, an aerial flight was conducted in August 2016 to look for landslides, surface erosion and general forest conditions in the project area as well as in the Wash and Slide Fire areas.

Focused road surveys were conducted on Road 470 (Swiftwater) and Road 651 (O'Hara/Hamby) in order to identify stream crossings, existing drainage structures, and potential drainage needs along roads near streams. General road conditions between crossings were noted and any problems with drainage were identified. Field survey notes of roads proposed for decommissioning were reviewed to assess crossings to be removed. The GIS road layer was overlain with the LIDAR hillshade layer (which shows topographic relief, road/trail prisms, and potential stream channels) where road surveys have not yet been conducted in order to estimate the number of stream crossings under roads. Google Earth imagery (dated 7/30/2016) in combination with field surveys were used to assess vegetative cover over project area streams and the availability of future woody material to those streams. GIS was used to calculate a variety of information including road and stream miles within the project area. The miles of stream and RHCAs, and hence the analysis associated with them, are greater than shown in the FEIS due to improved mapping using the LIDAR hillshade layer and field surveys. Data from Forest Plan monitoring in O'Hara Creek as well as PACFISH/INFISH Biological Opinion (PIBO) monitoring data collected in the Selway River and across Forest Service Region 1 (2001-2013) was also used (USFS, 2016, unpublished report).

FISHSED Modeling: The Forest Plan requires the use of the cobble embeddedness indicator in an analysis that considers project effects on aquatic habitat as it relates to fish productivity (i.e. habitat capacity). Cobble embeddedness is a measure of how the rocks in the stream are surrounded, or embedded by, small materials such as silt or sand. Estimates of existing cobble embeddedness in project area streams, combined with NEZSED outputs for peak sediment yield (see Hydrology section), were used to predict changes in summer and winter rearing carrying capacities for trout and salmon using the FISHSED model (Stowell et al. 1983). The model is run at the Forest Plan prescription watershed level only. The basic model assumption is that an inverse relationship exists between the amount of fine sediment in spawning and rearing habitats and fish survival and abundance. In general, when sediment yields are increased over natural rates, especially on a sustained basis, fish biomass can decrease (Bjornn et al. 1977). FISHSED is most appropriately used to assess the effects of changes in habitat quality when cobble embeddedness changes are modeled to be greater than 10% (Stowell et al. 1983). The FISHSED model is only useful for comparing alternatives (Conroy and Thompson, 2011) and is not designed to predict actual sediment levels. FISHSED calculations and additional information about the model, including assumptions, are in the project file.

Upward Trend: The analysis of expected trend in aquatic conditions is an important component of the aquatic and watershed assessments. Nez Perce Forest Plan Appendix A addresses trends in below-objective watersheds with upward trend direction. Upward trend means that stream conditions determined through analysis to be below the Forest Plan objective will move toward the objective over time. The Forest Plan did not specifically intend that the improving trend be in place prior to initiation of new activities and did not specify a time factor for achieving fish/water quality objectives in below objective watersheds (Conroy and Thompson 2011). Streams that require an upward trend analysis are those that do not meet Forest Plan objectives (usually based on cobble embeddedness) and are footnoted accordingly in Appendix A (pg. A-7). The project area prescription watersheds that do not meet their objectives and require an upward trend analysis are Lower O'Hara, Goddard, and Lodge Creeks. An upward trend analysis has been completed for these watersheds and can be found in Appendix F – Upward Trend Analysis.

The Forest Plan Appendix A Guidance document (Conroy and Thompson, 2011) describes how an upward trend can be determined. It is not solely based on cobble embeddedness levels in stream channels. The determination of existing condition and present or future improving trend should be done through a convergence of evidence using stream surveys, monitoring results, watershed condition inventories, literature reviews, predictive modeling and/or professional judgment. At the conclusion of the analysis, it must be demonstrated that an improving trend is either in place and would continue, or that an improving trend would be initiated as a result of past, present and future management activities.

3.5.4 Resource Indicators

The following resource indicators were developed based on both public comment and internal concerns and are associated with proposed road-related watershed improvement activities. Timber harvest was not considered as an issue indicator as monitoring indicates that the retention of PACFISH RHCAs are adequate to prevent harvest-related sediment from reaching streams (Nez Perce-Clearwater Forest, Draft, 2016; Sugden et al 2012; USDA Forest Service 2009; USDA Forest Service, 2006; Sridhar et al, 2004; Lee, et al 2004; Ott et al 2005; PACFISH, 1995; FEMAT, 1993; Belt 1992). Field surveys (2016) of private and state lands recently harvested in Elk City and Swiftwater Creeks also found no sediment moving into the buffers or streams.

Roads in RHCAs: There are miles of both system and non-system roads within PACFISH RHCAs. Many are not needed for future land management activities. Unneeded roads should be decommissioned and their culverts removed to reduce potential sediment input into streams from potential stream crossing failures.

Resource indicator: Number of road/stream crossings

Deposited Sediment: Excessive amounts of fine sediment, particularly sand, can reduce fish reproduction success by plugging spawning gravels and affecting egg development and/or larval fish emergence (Meehan, 1991; Waters, 1995). Sand bedload can also decrease food production by scouring or burying gravel substrates, and can decrease the amount of fish cover by filling in pools and burying logs (Alexander and Hansen 1983, 1986). The Forest Plan requires that projects in prescription watersheds that have the potential to increase sediment yield (i.e. “entries”), be modeled in both NEZSED and FISHSED. Modeled activities are timber harvest, road decommissioning, road reconstruction, and temporary road construction.

Resource Indicator: FISHSED results for modeled changes in cobble embeddedness, and summer and winter rearing habitat capacity

3.5.5 Existing Condition

3.5.5.1 Aquatic Habitats and Species

There are a minimum of 143 miles of mainstem and tributary streams in the project area. About 27 miles, or 23%, are fish-bearing with the majority occurring on the mainstem of the Lower Selway and Middle Fork Clearwater Rivers, as well as Swiftwater, Lower O’Hara, and Goddard Creeks.

The majority of streams within the project area are perennial but are typically steep with no, or only limited, amounts of fish habitat due to small drainage size and/or steep stream gradients. Natural fish barriers were noted in Lodge and Decker Creeks. Unnamed No.8 was not surveyed, however it appears there is a natural barrier near the mouth of this stream. Swiftwater and Elk City Creeks have no barriers but their gradients are higher, and stream size smaller than those preferred by steelhead trout and Chinook salmon. Habitat for westslope cutthroat trout is more abundant in these streams. Goddard and O’Hara have no identified barriers to fish in their mainstems within the project area.

Shallow water depths, a lack of pool habitat, and low instream wood levels were noted in all surveys with no streams meeting desired conditions. Pools are typically created by large wood throughout the project area and Clearwater River basin and they are particularly important for juvenile rearing. Low wood levels are common and are likely a result of infrequent fires within riparian areas. Fires, such as Johnson Bar, are expected to more quickly increase wood levels where riparian areas burned. This was observed in lower Elk City and Swiftwater Creeks in 2016 where about 20 burned trees had fallen into or over the streams. PIBO data collected in 2015 (USFS, unpublished data) showed a 30% increase in wood over 2009 levels at the Goddard Creek monitoring site. This also resulted in a slight increase in pool frequencies at the site.

Streambanks throughout area streams are stable and well vegetated both before and after the Johnson Bar Fire with only minor amounts of streambank erosion noted in lower Swiftwater Creek. This, in part, may be a result of increased stream flows from the Johnson Bar Fire; however no increase was noted in Elk City Creek. Both drainages experienced large amounts of high severity fire relative to their drainage size when compared to the remaining drainages in the project area. Bank stability was unchanged in Goddard Creek (USFS, 2015 unpublished data).

Riparian areas were, and are still, mostly dominated by western red cedar and grand fir with understory of moist shrubs, forbs and ferns. The Johnson Bar Fire burned in a mixed severity mosaic pattern with the highest severity fire occurring in the Burnt and Elk City Creek drainages. Burn severity is based on potential effects to soils and is not based on tree mortality. Within all project area RHCAs (5,900 acres), about 15 acres (0.3% of all RHCAs) experienced high severity fire. There were 700 acres (12%) of moderate severity and 1,100 acres (19%) of low severity fire. The remaining 4,085 RHCA acres (69%) were unburned. Post-fire helicopter reconnaissance and field reviews in 2015 and 2016 indicate thick vegetative cover along stream banks provided by forbs, shrubs, and trees. The RHCAs are expected to continue to contribute large wood and shade to streams as well as act as sediment filters for potential runoff from surrounding hillslopes as a result of this vegetation.

High temperatures on the mainstem Selway River are considered a limiting factor for Chinook salmon and trout (steelhead, westslope cutthroat, and bull) during the summer months. These species likely find cold-water refugia in tributaries such as Swiftwater, Goddard, Elk City and O’Hara Creeks. Temperatures are not considered limiting to steelhead spawning because they spawn in the spring when temperatures are cold. Temperatures in all streams exceed ideal rearing and spawning for bull trout during the summer and early fall months. The Selway and Middle Fork Clearwater Rivers act primarily as migratory corridors for bull trout during the late spring and early summer months but can also provide overwintering habitat for bull trout when temperatures are cool.

Stream substrates are dominated by larger substrates such as cobbles and rubble with lesser amounts of gravel. The only exception is Decker Creek which is dominated by gravel. The lack of gravels limit fish distribution and abundance, particularly for steelhead and salmon which require fairly large patches of gravel for spawning. The highest quality and quantity of Chinook salmon and steelhead spawning substrate occurs in lower O’Hara and Goddard Creeks and the mainstem Middle Fork Clearwater River. These stream reaches have low gradients and larger accumulations of spawning gravel than other tributaries in the project area. The mainstem Selway River provides only limited spawning habitat due to the dominance by cobble substrates.

Aquatic Species

There are 20 miles of designated critical habitat for ESA listed (threatened) steelhead trout in the project area (7 miles on the Selway River, 4 miles on the Middle Fork Clearwater River, 5 miles in Goddard Creek, and 4 miles in O’Hara Creek). Steelhead have been observed in all of these streams. Very low numbers of juveniles have been observed in the lower quarter mile of Lodge, Decker, Swiftwater and Elk City Creeks. These streams only provide minimal amounts of suitable steelhead habitat due to small stream size, moderate to high stream gradients, and low amounts of suitable spawning habitat.

Fall Chinook salmon, listed as threatened under ESA, are known to spawn in the mainstem Selway and Middle Fork Clearwater Rivers (Arnsberg et al, 2016) and as such the rivers are considered critical habitat even though they were not officially designated by National Marine Fisheries Service (NMFS). Fall Chinook are not known to occur in any of the other project area tributaries.

There are 15 miles of designated critical habitat for bull trout, also an ESA listed threatened species, in the Selway River, Middle Fork Clearwater River, and O'Hara Creek. Bull trout require cooler water temperatures than steelhead or salmon resulting in fewer numbers of fish in these streams. The Selway and Middle Fork Clearwater River are considered primarily as feeding, migration, and overwintering habitats (FMO) and do not provide spawning habitat for bull trout. There have been very few observations of bull trout in O'Hara Creek as a result of higher than preferred summer stream temperatures. O'Hara Creek is assumed to act primarily as overwintering habitat for bull trout.

Spring Chinook salmon, a Region 1 sensitive species, occurs in the mainstem Selway and Middle Fork Clearwater Rivers as well as O'Hara Creek. Spawning habitat is limited to the lower 4 miles of O'Hara with the highest quality habitat in the lower 2 miles. Very low numbers of Chinook juveniles have been observed in the lower Goddard Creek. Stream gradients in this, and the remaining project area streams, are too high which results in almost no spawning habitat for Chinook. Juveniles may use the areas near the mouths of the streams as thermal refugia during the summer months or to escape high spring flows.

Westslope cutthroat trout, a Region 1 sensitive species, occurs in all fish-bearing streams based on surveys conducted between 1989 and 2014. Cutthroat typically occupy smaller streams with lower flows when compared to steelhead and salmon. They require, and can utilize, pockets of small sized substrates which are common in the middle and upper reaches of project area streams. Their distribution is the widest among all salmonid species found in the area. No fish are known or expected to occur in the Unnamed No. 8 prescription watershed.

No redband trout, a Region 1 sensitive species, were identified during past or recent surveys. This is in part due to their physical similarities to steelhead trout which often make them difficult to separate from steelhead. Redband trout typically occupy similar habitats as westslope cutthroat trout.

No surveys for pearlshell mussels or Pacific lamprey have been conducted in the project area and neither of these species were mentioned during habitat surveys. While mussels may be present, none were observed during field surveys 2014. They prefer stable habitats near banks with coarse sand, and cobble or boulder substrates. There is adequate habitat for pearlshell mussels in O'Hara and Goddard Creeks. The Nez Perce Tribe is actively restoring Pacific lamprey populations to the Clearwater basin. The mainstem Middle Fork Clearwater and Selway provide migration, rearing and spawning habitat for the lamprey. Lower O'Hara Creek likely provides suitable habitat for lamprey.

3.5.5.2 Land Management Activities Affecting Streams

PACFISH was designed to halt degradation and begin recovery of streams where listed fish species occur in the Columbia River drainage. It accomplishes this through streamside RHCA retention and other guidance for management activities. RHCA widths are 300 feet on each side of a fish bearing stream, 150 feet on perennial non-fish bearing, and 100 feet on intermittent stream channels. There are a minimum of 5,900 acres (22%) of the analysis area within PACFISH buffers.

Harvest: Regeneration timber harvest has occurred on roughly 4,200 acres (16% of Forest Service managed lands) since the 1950s with an associated 100 miles of road building. Commercial thinning has occurred on 1,650 acres, or 6% of the project area, since 1970. An assessment of aerial photos shows that no-harvest buffers were retained on most perennial streams since the 1970s with most appearing to be a minimum of 100’ wide. Only the highest most headwater streams or seeps were not buffered. A total of 1,475 acres, or 35% of all regeneration harvest, occurred since PACFISH was implemented (1995) and appropriate sized buffers were retained. About 380 acres of past harvest have occurred within what is now the RHCA’s. The majority occurred in the upper half of Lodge Creek and headwaters of Swiftwater Creek in the 1960’s and 1970’s. All previously harvested RHCAs are currently well vegetated with trees and shrubs as seen on aerial photos, in the field, and in Google Earth.

Roads: Roads near streams are the primary land management-related activity that can affect stream conditions in the project area. Roads within riparian zones confine channels which can negatively affect sediment and stream flow movement (Meehan, 1991). When culverts under roads are undersized, they do not adequately allow for the passage of water and woody material during high stream flows. This increases the risk that the pipe will plug with material and fail during high flow events (Meehan, 1991; Flanagan, 2004). This can lead to an unwanted sediment pulse in streams. They are also costly to fix and the sediment delivered to streams can take decades to flush out of the system. Road failures also disturb existing vegetation and expose bare soil to potential erosion until the site heals. Riparian roads can reduce stream shading and disrupt large woody material recruitment due to a lack of trees within the road prism. This is evident primarily in lower O’Hara and lower Elk City Creek where the roads run adjacent to the streams. Ditchlines that drain roads can direct flow and road surface sediment into perennial streams at crossings, i.e. the roads are hydrologically connected to stream channels. These can be a chronic source of sediment and can increase water yield in streams. Increased water yields can lead to increased erosion of streambanks and addition of sediment to streams (Meehan, 1991). Roads located further away from streams or with adequate cross drain structures that hydrologically disconnect roads from streams limit the delivery of both runoff and sediments to the streams. The placement of additional drains close to stream crossings can significantly reduce the volume of runoff delivered at stream crossings (Takken et al 2008).

The local US Forest Service, BLM, USFWS, and NOAA (NOAA 1998) use the Matrix of Pathway Indicators to describe a variety of stream habitat and watershed conditions. Overall watershed road densities of <1 mile/mi^2 are considered in a “good” condition, 1-3 miles are considered “moderate”, and >3 miles/mi^2 are considered to be in “poor” condition. There are about 93 miles of road within the project area with watershed road densities ranging from 0.5 mi/mi^2 in Decker Creek (a good condition) to 4.6 mi/mi^2 in Lodge Creek (a poor condition). All remaining watersheds are in a moderate condition.

Conditions for RHCA roads are considered “good” when densities are <1 mile per square mile (mi/mi^2), “moderate” at 1–2 mi/mi^2, or “poor” at >2 mi/mi^2. A total of 18 miles of NFS system roads occur within RHCAs (Table 27). All roads in the project area are managed by the Forest Service. Road densities range from 0 in Decker Creek to 1.9 mi/mi^2 in Lodge Creek. Decker, and Goddard Creeks are in a good condition while the remaining watersheds are in a moderate condition for RHCA roads. Lower Selway has a very high density due to the presence of the Selway River Road 223 combined with a small RHCA area.

Table 27. Road stream crossings and RHCA road miles and densities.

Prescription Watershed	Total Stream Crossings	RHCA Road Miles	RHCA Area (sq mi)	RHCA Road Densities (mi/mi^2)
Lodge	44	1.5	0.8	1.9
Unnamed No. 8	2	0.2	0.2	1
Decker	0	0	0.3	0

Prescription Watershed	Total Stream Crossings	RHCA Road Miles	RHCA Area (sq mi)	RHCA Road Densities (mi/mi^2)
Swiftwater	50	1.7	1.1	1.5
Elk City	22	0.8	0.5	1.6
Goddard	56	2.1	2.7	0.8
Lower O'Hara[a]	36	4.2	3	1.4
Lower Selway[a]	18	7.4	0.7	10.6
Totals	**228**	**17.9**	**9.3**	

[a] Johnson Bar Fire Salvage project area only

Takken et al (2008) observed that the potential impact of roads cannot be measured accurately using a simple index of road density. Although road density is clearly important and is primarily associated with the number of direct stream crossings, factors such as contributing area to a road drain, landscape position and distance to streams are also significant factors. MacDonald (2005) found that only 25% of the 285 road segments he studied delivered sediment to streams. Black (2013) conducted a similar study using GRAIP monitoring and found that 7% of all drainage points in the study area delivered 90% of the road related sediment, and two percent delivered 50% of sediment. Al-Chokhachy et al (2016) found similar results in Montana. The Nez Perce Tribe conducted a GRAIP study in 2012 on almost 17 miles of Forest Road 651 (O'Hara Creek Road) and found 27% of all culverts were likely to directly deliver sediment to O'Hara Creek or its tributaries. This study resulted in a road improvement project that increased the size of 4 culverts and installed cross drains above them to disconnect the ditchline from these culverts in 2015.

Project area roads are mostly located on or near ridgetops, have relatively few stream crossings (Table 27), or are graveled or paved which helps to minimize their contributions of sediments or other contaminants to streams. A study by Swift (1984) showed that placement of crushed rock reduced sediment production by 70 percent from the unsurfaced condition. There are 7 miles (8%) of paved road, 58 miles (62%) of graveled roads, and 28 miles (30%) of native surface roads in the project area. Only 6 miles of the native surfaced roads are open to seasonal traffic (summer) and only 29 miles of the graveled roads open. In short, 62% of all roads in the project area are closed year round. The restricted use, both seasonally and year round, minimizes sediment input to streams as it prohibits use when road conditions are wet and most likely to experience surface erosion and subsequent delivery to streams at road crossings.

Stream crossings are the primary mechanism for delivering road-related sediment to streams. There are an estimated 228 crossings in the project area (Table 27) with about 94% occurring on small headwater streams ranging from 8" to 24" wide. About 14 crossings occur on streams larger than 48" and all are located in O'Hara Creek or along the Selway River.

Of the 17.4 miles of RHCA roads in the project area, 7 miles are associated with the Selway River Road 223 which is paved and has 9 stream crossings, none of which are fish bearing. This road is paved and not expected to contribute sediment to the river as a result. There are 3.5 miles of Road 651 adjacent to O'Hara Creek with an associated 12 culverts which may be contributing sediment to O'Hara Creek. The amount has likely been reduced, but not completely eliminated, through the addition of cross drains, replacement of 4 culverts, and resurfacing of the road that occurred between 2013 and 2015. The remaining 8 miles of RHCA roads likely contribute some sediment to streams but it is expected to be limited. This is due their construction perpendicular to streams which minimizes the interaction and connectivity between the road and stream. The streams are also very small and the roadside ditches well vegetated.

The relatively few stream crossings combined with well vegetated ditches that filter and retain sediment minimize road-related sediment input to streams. The overall conditions of roads and their surfaces were noted during field surveys. There was very few drainage, erosion or potential failure issues identified along the roads. Graveled roads showed little to no rutting or visible erosion and well vegetated and properly functioning ditchlines were observed (Figure 19 and Figure 20). Non-system Road JB-128 adjacent to Elk City Creek was observed to have water running down the road surface from seeps with only limited delivery. There were 2 sections of road where the stream was cutting into the road fill. This road is proposed for decommissioning (recontouring) with this project.

Figure 19. O'Hara Creek Road 651 ditchline, 2016

Figure 20. Swiftwater Road 271 ditchline, 2016

Grazing: There is currently only light RHCA use by cattle in the Tahoe-Clear Creek allotment. The majority of the allotment occurs in the Clear Creek drainage with an allowable 175 cow/calf pairs (average 250 acres per pair). The season of use is between June 1 and October 30. Field observations by the project noted only limited trampling and grazing in a few riparian areas, with most occurring on the Clear Creek side of the allotment. Most were associated with small flat areas in headwater streams adjacent to roads or at road crossings. The existing thick, mostly unpalatable vegetation and steep terrain along streams inhibit their use by cows. Little evidence of cow use was noted in the project area with only minor use on the flat ridgetop areas of Lodge Creek.

3.5.5.3 Forest Plan Water Quality Objectives

The Nez Perce Forest Plan contains Water Quality Objectives for streams in the project area (Nez Perce Forest Plan, Appendix A). These are assessed using the Desired Future Condition Analysis (DFC) developed by Espinosa (1992) and are based on sediment levels as directed by the Forest Plan Appendix A Guidance document (Conroy and Thompson, 2011). Specifically the guidance states the following:

> “Of the basin wide stream survey data collected over the years, the habitat components that appear to be the most repeatable and most reliably differentiate between reference and managed watersheds are measures or estimates of substrate condition, including cobble embeddedness and percent surface fines. In addition, fish/water quality objectives in Appendix A were originally established based on substrate sediment only (Forest Plan Resource Documentation Report, Stowell 1986).
>
> …The portion of the DFC analysis that provides objectives for cobble embeddedness and percent fines by depth would be retained. Collection of measured substrate data, combined with existing legacy data and current PIBO data, where available, would be used to describe

the existing condition. Substrate data would be the primary determinant in assessing whether Appendix A fish/water quality objectives are met."

Appendix A states that for those streams that don't currently meet their water quality objective and are footnoted as such, an upward trend (improvement) is required. Timber management can occur in watersheds not currently meeting their water quality objectives, concurrent with improvement efforts as long as a positive, upward trend in habitat carrying capacity is indicated. Cobble embeddedness was the only parameter used to determine whether or not the objectives were being met (as directed by the Forest Plan and Appendix A Guidance).

Cobble embeddedness surveys were conducted in riffles to characterize substrate composition and percent embeddedness. The cobble embeddedness data was compared to objectives as defined in Espinosa (1992) to determine if streams met their Forest Plan fish/water quality objectives. The results are shown in Table 28. A slight decline was seen in Swiftwater Creek and a large decline in Elk City Creek. Goddard was somewhat stable and O'Hara Creek showed high variability among survey years. Standard deviations from the means ranged from ±11 to 31%.

Table 28. Water quality objectives for watersheds in the Johnson Bar Fire Salvage project area

Forest Plan Prescription Watershed	Forest Plan Water Quality Objective	% Cobble Embeddedness (year)[a]	Current Fishery Habitat Potential[b]	Water Quality Objective Met?
Lodge Creek	80%	38% (1989)	73%	No
Decker Creek	80%	67% (2013)	41%	No
Swiftwater Creek	80%	40% (2016) 42% (2013)	71% 68%	No
Elk City Creek	70%	34% (2016) 47% (2015) 56% (2013)	79% 62% 52%	Yes
Goddard Creek	80%	53% (2016) 54% (2015) 52% (2013)	57% 54% 58%	No
Lower O'Hara	90%	41% (2016) 40% (2014) 25% (2012) 29% (1991) 64% (1990) 30% (1989) 29% (1988)	70% 71% 88% 83% 43% 82% 83%	No

[a] Desired conditions for cobble embeddedness for low and moderate (<5%) gradient channels are as follows: 90% objective- CE<30%; 80% objective- CE<35%; 70% objective-CE<40%.
[b] Fishery habitat potential is assessed based on the Forest DFC Analysis (Espinosa, 1992). Existing cobble embeddedness levels are compared to a DFC graph to obtain the Percent Fishery Habitat Potential. If the Fishery Habitat Potential is greater than or equal to the Forest Water Quality Objective, the objective is being met. The actual cobble embeddedness level is not equivalent to the Forest Plan Water Quality Objective.

All streams with the exception of Elk City Creek do not meet their water quality objectives based on cobble embeddedness. Forest Plan Appendix A requires that an upward trend analysis is required for Lodge, Goddard and Lower O'Hara Creeks. The remaining prescription watersheds do not have this requirement. A general summary of trends is included below and a more detailed analysis by prescription watershed can be found in Appendix F – Upward Trend Analysis. Elk City and Swiftwater Creek trends were included for informational purposes only.

Lodge, Goddard, and O'Hara Creeks do not meet their objectives; however IDEQ has determined that they do meet their beneficial uses (IDEQ, 2014). IDEQ determines whether a water body fully supports its designated and existing beneficial uses by evaluating whether the applicable water quality standards and criteria are being achieved and whether a healthy, balanced biological community is present (http://www.deq.idaho.gov/water-quality/surface-water/beneficial-uses.aspx). Beneficial uses are determined using both physical habitat data and biological data (insect and fish presence in varying levels). It should be noted that even streams in unmanaged areas (roadless, wilderness) often do not meet their DFCs (IDEQ, 1999; various stream habitat surveys from the Clearwater NF) due to natural processes and the fact that stream systems are not static. IDEQ did not assess Decker, Swiftwater and Elk City Creeks.

Upward Trend Summary Aquatic Species

Appendix A of the Forest Plan states that where streams do not meet their water quality objectives, timber management can occur in watersheds concurrent with improvement efforts as long as a positive, upward trend in habitat carrying capacity is indicated. The water quality objectives make up only a small part of the upward trend determination. Lodge, Goddard, and Lower O'Hara Creeks are the only streams requiring an upward trend analysis according to Forest Plan Appendix A. Where data was available, trends for other streams were included for informational purposes.

Appendix A does not specifically describe what contributes to an upward trend or the timeframe at which that trend should be achieved. The Nez Perce Forest therefore developed a guidance document that clarifies how to interpret Appendix A (Conroy and Thompson 2011). The guidance states the following: "Upward trend means that stream conditions that are below the Forest Plan objective will move toward the objective over time. Stream specific determination of existing condition and present or future improving trend should be done through a convergence of evidence using stream surveys, monitoring results, watershed condition inventories, literature reviews, predictive modeling, and professional judgment. It must be demonstrable that an improving trend is either in place and will continue, or that an improving trend will be initiated as a result of past, present and future management activities. The Forest Plan did not specifically intend that the improving trend be in place prior to initiation of new activities. It also did not specify a time factor for achieving fish/water quality objectives in below objective watersheds."

It states that "it was assumed in the Forest Plan that implementation of instream restoration and other watershed restoration activities would result in an upward trend in carrying capacity. Where these activities have been implemented, it could be stated that an upward trend in the habitat conditions has been accomplished. This may be done expressly for this purpose or in conjunction with timber or other resource management. There is no specific requirement that upward trend projects be implemented prior to timber harvest activities."

It goes on to say, "In previously degraded watersheds, especially those identified as below objective in 1987, if there have been no entries or natural disturbances over the past 10 to 20 years, it could be assumed that trend is either static or improving. If any watershed restoration has been implemented, or if a change in management (e.g. grazing and roads management) has resulted in fewer potential adverse effects to streams, an upward trend could be assumed in these cases as well." The Forest Plan did not designate a timeframe for achieving an upward trend, only that one would could be demonstrated where water quality objectives are not met.

Sediment: Cobble embeddedness measures how much of the cobble and gravel substrate is embedded by sands and silts and is used to determine if Forest Plan water quality objectives are met. High embeddedness can reduce the quantity and quality of fish spawning and rearing habitat by filling in the interstitial spaces between the larger substrates. Elk City Creek showed an obvious improving trend, O'Hara Creek had highly variable levels with no apparent trend, Goddard was relatively stable and Lodge Creek did not have enough data for a trend analysis (Table 28).

Wolman pebble counts are used to measure the distribution of different sized substrates in the stream and were conducted between 2012 and 2016. Unlike cobble embeddedness, improving trends for fine sediment based on pebble counts were observed in Swiftwater, Elk City, Goddard and O'Hara Creeks (Table 29). The amount of fine grained substrates (<4mm in diameter, i.e. very fine gravel and sand) showed decreases which indicates improving trends in those streams. There was no data available for Lodge Creek.

Table 29. Results of Wolman pebble count data for fine sediments <4mm diameter)

Forest Plan Prescription Watershed	% Fines <4mm (year)
Lodge Creek	No data
Swiftwater Creek	7% (2016) 17% (2015) 13% (2013)
Elk City Creek	8% (2016) 17% (2015) 17% (2013)
Goddard Creek	10% (2016) 18% (2015) 27% (2013)
Lower O'Hara	7% (2016) 15% (2014) 17% (2012)

Restoration Activities: A variety of restoration activities have been implemented to reduce potential road related sediment input to streams. A total of 24 miles of road decommissioning occurred in the 1990s in Swiftwater, Goddard, and Lodge Creeks with an associated removal of about 62 culverts. The primary benefits of decommissioning include the elimination of road related landslides and the return to more natural hydrologic and forested conditions on the landscape. It results in a long term reduction of sediment input into streams as shown by local monitoring on the Forest where a major road decommissioning project was conducted. A total of 71 miles of road were fully re-contoured in the 3,500 acre Badger Creek watershed (Lochsa River drainage) between 2001 and 2006. A minimum of 120 stream crossings were removed associated with these roads. Pebble count data was collected in the lower mainstem of the creek below the majority of the decommissioning activities. The percent fines prior to decommissioning in 2001 was 33%. The levels dropped to 23% by 2004. An increase to 28% occurred in 2007 and was likely due to a large rain event that moved stored sediment downstream. By 2011, the percent of fine sediment had dropped to 13%, well below what it was before the project was implemented. Similar decreases are likely to have occurred in the Johnson Bar project area as a result of the 1990s decommissioning; however, no monitoring was conducted to assess the results of the projects.

Road improvement projects have also occurred in the project area. One project installed additional cross drain culverts on Road 651 in order to hydrologically disconnect the road from O’Hara Creek and its tributaries. In addition, culvert replacements have occurred in O’Hara Creek (Road 651- 4 pipes) and Lodge Creek (Road 653- 5 pipes; Road 286A- 4 pipes) in order to reduce the risk of culvert failures. Lastly, Forest Road 651 (O’Hara) and Road 470 (Swiftwater) are graveled and receive regular maintenance in order to alleviate road erosion and subsequent sediment delivery problems. All of the projects described above are designed to greatly reduce or eliminate sediment delivery to streams from roads and are assumed to result in an upward trend in project area streams.

Road access management also contributes to an upward trend through road use restrictions that limit access to roads particularly during the wet fall and spring seasons when sediment is most likely to be delivered to streams. A total of 38% of all roads in the project area are open to motorized vehicle use at some time of the year. Only 6% of all roads are seasonally opened native surface roads and 32% of all roads are open year round and are graveled. The restriction of 68% of all roads to motorized use either year round or seasonally is expected to contribute to an upward trend.

Buffers: The retention of streamside buffers has also contributed to an upward trend by retaining all the components necessary to build aquatic habitats. FEMAT (1993) showed that the probability that a falling tree will enter the stream is a function of slope distance from the channel in relation to the tree height. The analysis showed that 100% of wood delivered to streams comes from within one site potential tree height of the stream (150’ in the project area). The buffers include all vegetation, live and dead, adjacent to and upslope from streams. The vegetation provide for streambank stability, shade, and large wood. They are also capable of filtering upslope generated sediment before it reaches streams. Buffers were retained adjacent to harvest units from the 1970s through 1995 (prior to PACFISH requirements). Imagery shows most streams except for some very small headwater areas retained buffers of 50’ or wider. The buffers were generally 150’ or wider on mainstem streams such as Swiftwater and Goddard Creeks. Recent buffer monitoring on the Clearwater National Forest showed no delivery of sediment to either the buffer or to streams after harvest and burning treatments (USDA Nez Perce-Clearwater Forest, Draft, 2016). Buffers averaged 150’in width.

PACFISH buffers around landslide prone areas have also been implemented to limit the risk of management related landslides. These buffers retain all the components necessary to build aquatic habitats (wood and substrate). Landslides are necessary from time to time and the RHCAs allow those events to occur at an assumed natural rate. One such slide occurred in Elk City Creek in the fall of 2014 and was likely the result of the Johnson Bar fire. It occurred on a landslide prone landtype with no previous timber harvest. Both wood and substrates were delivered to Elk City Creek. The deposited material created both riffle and pool habitats. A second slide resulting from the 2015 Wash Fire was also observed outside the project area and contributed similar material to Meadow Creek. Buffers were designed to allow natural trends to occur in aquatic habitat development.

In summary, upward trends have been established in project areas streams through the combination of road decommissioning, road improvement, and road access management as well as streamside buffer retention. Wolman pebble counts indicate a reduction in the percent of fine substrate in Swiftwater, Elk City, Goddard and Lower `O’Hara Creeks. The combination of restoration activities, use of pebble count data and other local monitoring results support an upward trend in project area streams. These determinations are consistent with the Forest Plan Appendix a Guidance document for determining upward trends (Conroy and Thompson, 2011).

3.5.6 Direct and Indirect Effects

Direct and indirect effects areas are assessed at the Forest Plan Prescription watershed level as these are the lowest level at which effects from activities could be seen. Cumulative effects are assessed at the subwatershed (HUC12) scale. Effects would be diluted to non-existent at any scale larger than this.

3.5.6.1 Alternative 1

No logging, road decommissioning, and culvert replacements or removals would occur under this alternative. Any watershed improvement activities (culvert replacements/removals through road reconstruction, storage and decommissioning) would require additional NEPA analysis prior to implementation.

No direct effects to streams would result from the No Action Alternative, since no stream channels or streamside areas would be disturbed.

The indirect effects include the following:

- One culvert that is in poor condition on Road 470 would remain in place; however it has a low risk of failure due to its headwater location and small stream size.

- The 5.7 miles of RHCA roads (system and non-system) proposed for decommissioning could continue to deliver sediment to streams through future road failures or road surface erosion. A total of 1.2 miles are graveled and the remaining 5.5 miles are native surfaced. There are 57 stream crossings associated with these roads. The risk of failure varies depending on the location of the road and the age of the structure. Roads on steeper slopes have a greater risk of failure as do their associated crossings whose risk increases as a result of structure condition deterioration as they age. About 50% of the RHCA roads proposed for decommissioning occur on modeled landslide prone areas.

- Elk City Creek provides an example of the risk associated with leaving unneeded roads on the landscape. A non-system road lies adjacent to the stream yet has only a few culverts; however, surface water was observed moving over and down the road at multiple locations. In addition the stream was undercutting the road prism in 2 locations. The fire related landslide that occurred in Elk City Creek in 2014 washed out a small section of the road proposed for decommissioning. The risk of further washouts of the road fill would continue under the No Action Alternative. Undercutting of the road prisms and the addition of fine sediments would also continue.

- No road storage, and the crossing removals associated with it, would occur under this alternative. A total of 13 culverts would remain in place in Lodge Creek (7 crossings) and Goddard Creek (6 crossings) on roads not needed in the short term but are still needed for long term management. Retaining culverts in place on these types of roads increases their risk of failure if they do not receive regular maintenance. None of these roads occur on modeled landslide prone areas therefore the risk for a large failure is less than those occurring on steeper slopes.

- The roads that are not needed for future or short term management are currently closed to public use; however, they still have the potential to negatively affect stream channels if their crossings or fills fail.
- There would be no management-related change, either positive or negative, from the existing aquatic habitat condition. Instream and riparian processes of habitat development and wood recruitment would continue in the project area. Riparian habitat conditions would continue to improve as trees grow and age, continuing to provide shade, streambank stability and large woody debris to streams. Sediment levels may increase in the event of culvert or road failures; however it is not possible to determine when, where, or how much they would deliver to streams.

The No Action alternative would inhibit the ability of the Forest to further limit or reduce sediment delivery to streams from roads in order to meet or maintain Forest Plan water quality objectives. A total of 70 crossings would remain in place that could fail and contribute sediment to streams. This alternative has the potential to affect the Idaho state standard beneficial uses in the event of stream crossing or road failures. The risk of crossing failures increases as culverts age (>30 years old) and their conditions deteriorate.

3.5.6.2 Alternatives 2, 3, and 4

Effectiveness of Design Features and BMPs

PACFISH RHCAs: All management activities since 1995 implemented PACFISH buffers in order to eliminate or reduce impacts to riparian areas and streams. With no new large disturbance in RHCAs, there should be no long term negative changes to the measured habitat parameters as a result of past-1995 timber harvest activities. Various field reviews and monitoring activities support the conclusion that the habitat conditions have improved. Much of the recovery is likely a result of less land disturbing activities, better application of BMPs, RHCA retention, and better road design (CNF, 2008; pg. 91). Monitoring results from the PACFISH/INFISH Biological Opinion (PIBO monitoring across the Upper Columbia River Basin) indicate improving trends in pool depth, bank stability, large wood frequency and volume in both reference and managed sites (USDA Forest Service 2012). There were no significant trends for percent fines, and negative trends in the percent of pools were observed in both reference and managed sites. Because the trends were similar at both reference and managed sites, they surmised that the lack of or negative trends in percent fines and pools may not be management related. A summary of PIBO data collected between 2001 and 2013 just within Region 1 of the Forest Service showed desired trends in all parameters except for percent pools (USDA, 2016, unpublished report). Percent pools had an overall 2% decrease where increases would have been expected. The overall percent pool tail fines (a measure of fine sediment) decreased by 14% within the region which is the desired trend for sediment. The data suggests that PACFISH RHCAs are highly effective at reducing impacts to riparian areas and streams from management activities.

Local monitoring of 23 miles of RHCAs and 5.5 miles of temporary road after timber harvest and burning of the units was completed on the Lochsa District in 2014 (USDA Nez Perce-Clearwater Forest, 2016). There was no evidence of sediment moving from harvest units into RHCAs or sediment moving from temporary roads into harvest units or RHCAs. The thick vegetation that makes up RHCAs acts as an excellent, virtually impenetrable, filtering source for overland sediment flow. Retaining downed woody debris within the harvest units also provides structures that capture sediment and slow or stop its movement down the slope. A walk-through survey of the RHCAs adjacent to harvested IDL and private lands after the Johnson Bar Fire was conducted in 2016. There was no evidence of sediment entering Elk City or Swiftwater Creeks which was due to the streamside buffer retention and the retention of downed woody material throughout the units (see cumulative effects section below).

No-harvest buffers of 100 feet to 50 feet adjacent to streams within timber sales have been shown to be adequate in protecting the riparian vegetation necessary to maintain natural stream temperature levels (Anderson and Page 2014; Tot et al 2005; Lee et al 2004; Sridhar 2004; FEMAT 1993). PACFISH buffers greatly exceed these guides on fish bearing streams and meet the guides on non-fish bearing and intermittent streams.

Best Management Practices (BMPs): BMPs would be followed for all action alternatives as stipulated by the Idaho Forest Practices Act. Idaho water quality standards regulate non-point source pollution from timber management and road reconstruction activities through the application of BMPs. The adjacent Clearwater National Forest has an excellent record of successful implementation of BMPs. Between 1990 and 2002, the Forest had a BMP implementation rate of 98% and a 97.8% rate of effectiveness (USDA Forest Service, 2003). Survey results from 2004 through 2008 indicate implementation and effectiveness rates of 98% or greater (these reports can be found on the world wide web at: http://www.fs.usda.gov/detail/nezperceclearwater/landmanagement/planning/?cid=stelprdb5408439. The same BMPs are applied to the Johnson Bar Fire Salvage Project and are expected to have similar results.

Road Work: Road reconditioning includes brushing, blading, and spot surfacing roads with gravel where needed. Blading and rocking is done to provide an even and reinforced running surface that can withstand truck traffic. Cleaning ditches and adding cross drains can also occur to maintain or improve drainage. Overall these activities are considered beneficial to water quality (Burroughs 1990; Grace and Clinton 2006; Switalski et al. 2004; Swift and Burns 1999). Foltz (2008) showed that the use of high quality aggregate (gravel) produced 3 to 17 times less sediment than marginal quality aggregate. The basalt aggregate used for Johnson Bar project roads is composed of basalt which is considered high quality as it does not easily break down into smaller, dust forming particles. A study by Swift (1984) showed that placement of a 6-inch lift of 1.5-inch minus crushed rock reduced sediment production by 70 percent from the unsurfaced condition over a 5-month period. The gravel achieved this amount of protection even though this period included 6.46 inches of rainfall in 5 days. In 13.3 months, the gravel with established grass at the margins of the traveled way reduced sediment production by over 84 percent compared to 9.5 months when the road was unsurfaced; [cited in Burroughs and King, 1989]. The Swiftwater (Rd. 470) and O'Hara Creek (Rd. 651) roads are regularly graveled to maintain them in optimum conditions for travel.

Burroughs and King (1985) also conducted a study on the Nez Perce Forest using simulated rainfall to generate runoff and sediment yield from forest roads, ditchlines, and fill slopes. The reduction in sediment production by graveling the road was 79% and remained effective for several years. They also found that where dense grass cover was present on the fill slopes of the road, sediment yield was reduced by 99%. The cut and fill slopes and ditchlines of roads within the Johnson Bar project area are densely vegetated with grasses and shrubs (Figure 19 and Figure 20). These conditions, along with the perpendicular stream/road crossings minimize the risk of roads contributing large amounts of sediment to streams.

Road reconstruction includes adding cross drain culverts near flowing streams in order to divert ditch water and its associated sediment onto the forest floor instead of into the stream. Damian (2003) found that installation of cross drains at optimum sites reduced sediment delivery by

76%. The most important location for a cross drain was within 100’-200’ from a stream crossing. A number of studies have also shown that roads can affect the volume and distribution of overland flow and alter channel network extent, pattern, and processes (Harr et al., 1975; King and Tennyson, 1984; Montgomery, 1994; Jones and Grant, 1996; Wemple et al., 1996, 2001); [cited in Croke, et al., 2005]. Water control structures, such as ditches with relief culverts, broad based dips, water bars, and turnouts, are used to drain insloped road surfaces and minimize the travel length of overland flow (Keller and Sherar, 2003); such that, increasing number of cross-drains reduces drainage area that collect water, reduces erosion, and hydrologic connectivity of road segments to streams [cited in Brown, et al., 2013]. Field observations in 2015 noted much of the road network is outsloped away from ditchlines particularly on curves in the road prism. Outsloping diverts sediment away from streams and into forest vegetation. Cross drains are in place elsewhere and additional drains would be installed on Road 9723-B. A total of 5.6 miles of road would be reconstructed under all action alternatives.

Road reconstruction also includes the replacement of existing culverts at live stream crossings that are sized for a 100-year flow event. Culverts sized to handle these events are less likely to plug with debris and fail when compared to smaller pipes. One headwater culvert is proposed for replacement under the Swiftwater Road and two would be installed on Road 653-A in Lodge Creek.

Dust abatement on log haul roads is designed to minimize the amount of road related sediment (via fugitive dust and road surface erosion) added to streams. A 1993 study by Sanders and Addo showed that dust abatement produced half the amount or less of dust as untreated graveled roads. They also showed that traffic speeds affect the amount of dust produced. Slower traffic speeds (20 -30 mph) produce half as much dust as higher speeds (40+ mph). Log haul traffic speed is not expected to exceed 25 mph and would be closer to 15 mph due to the narrow, twisty road network in the project area. Monlux (2007) found a 90% reduction in observed dust. He also found that the dust abated roads required less surface blading than untreated roads. Blading on untreated roads was required after 3,200 vehicles while blading on treated sections was needed after 25,500 vehicles. All haul roads would receive dust abatement treatments prior to log haul.

Design features would be used to minimize direct input of sediment to streams from management activities. PACFISH RHCAs would be retained on perennial and intermittent streams adjacent to timber harvest units. Temporary roads would be built along or near ridgetops with no stream crossings and no hydrologic connectivity to streams. They would be obliterated within 2 operating seasons. Road reconstruction and reconditioning would install cross-drain culverts to divert roadside ditch flow onto the forest floor instead of into streams. Road surfacing with gravel on both reconditioned and reconstructed roads would also occur where needed to minimize sediment production and delivery to streams. Road decommissioning would remove all perennial and intermittent stream channel crossings and would recontour roads within RHCAs.

Effects of the Action Alternatives

Timber Harvest and Temporary Roads

No direct or indirect effects to aquatic habitats or fish species are expected from timber harvest or temporary road construction. RHCAs are effective at preventing sediment delivery to streams from these activities based on local monitoring. They are also effective at maintaining stream temperatures (see Effectiveness of Design Features and BMPs).

Road Improvement and Log Haul

Road reconstruction would replace 3 culverts on headwater streams. Only minimal downstream effects are expected when the new culverts are re-watered. Some sediment may travel downstream but would not travel more than 300 feet due to small stream size and the flat areas below the crossings that would easily filter out and trap sediment. The streams are less than 12" wide and 2" deep during the dry months when they would be replaced. The negligible amount of sediment added (about 4 pounds per site based on Foltz et al, 2008) would not affect fish or their habitat as the crossings are 1 mile away from fish bearing portions of Swiftwater Creek and 3 miles away in Lodge Creek.

Road reconditioning would only add or replace cross drain culverts. There would be no negative direct or indirect affects to streams since no live water is involved in the cross drain work. Positive effects from the addition of cross drains are expected as they would route potential ditchline sediment away from streams.

There are 62 miles of road that would be used for log haul. An estimated maximum of 2,039 loads of logs would be hauled down Road 651, 577 loads hauled on Road 470, and 1,772 loads hauled down Road 286 under Alternative 2. A total of 34% of the sale loads would be hauled on Road 651, 10% on Road 470 and 30% on Road 286. The remaining 26% or 1551 loads would be helicopter yarded directly to Highway 12 or the Selway Road 223. Log haul would occur during dry or frozen conditions with most occurring between the months of June and September. Based on a 2 year contract, an estimated 49 loads per day would be hauled on these gravel roads (23 loads/day on Road 651; 6 loads/day on Road 470; and 20 loads/day on Road 286).

There are 75 perennial stream crossings associated with log haul roads. Log haul can generate sediment as a result of road surface erosion. Whether that sediment is delivered to streams depends on the road design including surfacing, slope, and road shape all of which can affect road drainage patterns. Sediment delivery to streams occurs primarily through ditchlines that are hydrologically connected to live stream crossings. Most of the Johnson Bar roads are on or near ridge-tops and either have no crossings or only cross small (<18") headwater streams. Five of the 80 crossings occur over fish-bearing streams. Three are bridges on Road 651 over O'Hara Creek and two are paved bridges over the Selway River. The 3 bridges are elevated with flat approaches that drain into the well vegetated floodplain with minimal expected delivery to O'Hara Creek. About 3 miles of Road 651 runs directly adjacent to O'Hara Creek and crosses 6 unnamed perennial tributaries which flow into O'Hara Creek. Four of these culverts were upgraded between 2015 to alleviate potential sediment delivery from the crossings. Cross drain culverts or the outsloped design of the roads near these culverts function to divert road related sediment away from the ditchlines and the crossings themselves. There are an additional 24 crossings in the O'Hara drainage which could deliver sediment to streams. Most are expected to occur on small streams (<24" width). The state of cross drains associated with these crossings is unknown. Approximately one-quarter mile of Road 470 lies adjacent to Swiftwater Creek but with no crossings and little risk of delivery. Five stream crossings on Road 653 were upgraded or replaced as part of the Lodge Point Project in 2013. This road is almost flat at the stream crossings which limits potential delivery to streams and ditches. There are 3 crossings on very small streams on Road 286 (outside of the project area). This road is outsloped or flat at these crossings.

A total of 3 miles of the haul roads are native surfaced and occur on or near ridgetops. There are 2 headwater (<12") stream crossings in Lodge Creek associated with these roads. The risk of measurable sediment delivery to Lodge Creek is low based on their location and stream size. The remaining 59 miles of haul roads are graveled. Graveling has been shown to minimize erosion and potential sediment delivery to streams (Swift, 1984). The well vegetated ditches found throughout the project area are also expected to minimize sediment delivery to streams by filtering and retaining road related sediment in the ditchlines. In general the slope and shapes of the haul roads are highly variable with outsloped segments, and segments disconnected from ditchlines, not expected to contribute sediment to streams.

In addition to gravel, cross drains, and well vegetated ditchlines, dust abatement would minimize sediment delivery to streams from log haul. Limiting or restricting hauling during wet periods would also minimize potential delivery to streams and damage to the road surface. Alternative 3 would have 15%, and Alternative 4 would have 43% fewer log truck loads hauled on project area roads than Alternative 2. This would result in less sediment delivery potential to streams when compared to Alternative 2.

Road Decommissioning and Storage

There would be no difference between the three action alternatives related to road crossings or RHCA road densities as all remove the same number of roads and stream crossings through proposed road decommissioning and storage.

Roads not needed for future management are being decommissioned and roads not needed for the short term but are needed for long term management are being stored. A total of 0.8 miles of system RHCA road and 5.3 miles of non-system RHCA roads would be decommissioned. A total of 1.6 miles of RHCA roads would be stored. Table 30 summarizes the number stream crossings removed, and road miles decommissioned or stored for RHCA roads. The majority of the work occurs in Goddard, Elk City and Lower O'Hara Creeks.

A total of 70 culverts would be removed as a result of the activities which would reduce the risk of potential future crossing failures (Foltz et al, 2008; McCaffrey et al, 2007; Switalski et al, 2004; Beschta, 1995). This equates to a 30% reduction in the number of crossings in the project area. The reduction of risk is expected to have long term benefits to project area watersheds (McCaffrey et al, 2007; Switalski et al, 2004). Assuming there are 100 cubic yards of fill material over each crossing, a total of 7,000 cubic yards (700 dump truck loads) of material would be removed and would not be at risk for future failure into streams. In addition, road storage would place the road prism in a hydrologically stable condition until it is needed which also reduces the risk of road fill failures. Reduced instream sediment levels are as expected from these activities based on local monitoring in Badger Creek on the Lochsa River. The percent of fine substrates prior to road decommissioning was 33% and dropped to 13% within 10 years of project implementation.

Table 30. Road decommissioning and storage RHCA miles treated and crossings removed by prescription watershed.

Prescription Watershed	Total Stream Crossings Removed	RHCA Stored Roads		RHCA Decommissioned Roads		
		System (miles)	Crossings Removed	System (miles)	Non-System (miles)	Crossings Removed
Lodge	12	0.4	7	0.1	0.3	5
Unnamed No. 8	-	-	-	-	-	0
Decker	-	-	-	-	-	0
Swiftwater	13	0.1	-	0.4	0.3	13
Elk City	12	-	-	-	1.8	12

Prescription Watershed	Total Stream Crossings Removed	RHCA Stored Roads		RHCA Decommissioned Roads		
		System (miles)	Crossings Removed	System (miles)	Non-System (miles)	Crossings Removed
Goddard	15	1.1	6	0.3	1.2	9
Lower O'Hara[a]	11	-	-	-	1.5	11
Lower Selway[a]	7	-	-	-	0.2	7
Totals	**70**	**1.6**	**13**	**0.8**	**5.3**	**57**

[a] Johnson Bar Fire Salvage project area only

Culvert removal would have the greatest long term positive effect to streams from proposed activities; however they would contribute small amounts of sediment in the short term. Instream activities during culvert removals would introduce visible amounts of sediments immediately downstream of the sites. The sediments would settle out downstream; the distance is expected to be less than 600 feet based on past monitoring of large fish passage pipe replacements on the Forest. Removals for the Johnson Bar Project occur on very small streams (<36") or seeps with sediment travel distances expected to be less than 300'. This is due to very low stream flows and therefore a very low downstream delivery potential. Sediment input would occur over a short time frame (<1 day per site).

The estimated amount of sediment potentially added to a stream from culvert removals when BMPs are applied averages 0.002 tons (4 pounds) per site (Foltz et al. 2008). The removal of 70 crossings and the fill material associated with them could add 0.14 tons (280 pounds) of sediment to project area streams. The majority of turbidity associated with culvert removals is associated with the disturbance of existing instream sediment. Very limited amounts of new sediment are added to the stream due to design feature (BMP) implementation. This amount of sediment would be immeasurable in fish bearing streams as no more than 60 pounds would be added to any one prescription watershed. No direct effects fish species would occur, as none are known to reside within a minimum of 1,000 feet of any of the removal sites. Culvert removals would provide indirect benefits to the aquatic system by eliminating the risk of future crossing failures.

Westslope cutthroat trout could be affected during the removal of the road adjacent to Elk City Creek. Some sediment may flow into the creek within the first year after decommissioning however the placement of woody material and other vegetation on the surface of the road is expected to minimize the amount of erosion that occurs. The road expected to be vegetated and stable within 2 years based on local monitoring of similar projects.

RHCA road densities show very little change from the existing condition. Reductions of 0.1 mi/mi^2 would occur in Lodge and Goddard Creeks and a reduction of 0.3 mi/mi^2 would occur in Swiftwater Creek. No changes would occur in the remaining prescription watersheds. Final RHCA road densities would fall into the NOAA matrix "good condition" category for Decker, and Goddard Creeks, in the "moderate condition" category in Lodge, Swiftwater, Elk City and Lower O'Hara, and "poor condition" category for the Lower Selway; however the Lower Selway Road is paved and unlikely to contribute sediment to the river.

FISHSED Results

Existing cobble embeddedness data was combined with NEZSED outputs for peak sediment yield in the FISHSED model. The model is used to predict changes in cobble embeddedness, and summer and winter rearing carrying capacities for steelhead trout and salmon. The model documentation (Stowell et al, 1983) model outputs are not absolute numbers of high statistical precision and results obtained are to be used in combination with sound biological judgment. The limitations and assumptions about the model can be found in the project file (Stowell et al, 1983). The FISHSED model can only be used to compare alternatives and cannot be used as a trend analysis tool since trend analysis is beyond its capabilities (Conroy and Thompson, 2011). Both state and private timber harvest was included in the NEZSED model runs, and therefore the FISHSED runs. Their effects have been accounted for in the analysis.

The FISHSED model predicts a 0–3% change in cobble embeddedness and summer/winter rearing capacity for juvenile steelhead trout for the action alternatives. The changes are 0-1% for all watersheds except for Swiftwater Creek where changes range from 1-3%. FISHSED is most appropriately used to assess the effects of changes in habitat quality when cobble embeddedness changes are greater than 10% (Stowell et al. 1983). Predicted changes for the proposed actions are well below 10%. No substantial changes in cobble embeddedness and summer/winter habitat rearing capacity are therefore expected based on this modeling and on PACFISH and local effectiveness monitoring (USDA Forest Service 2009a; USDA Nez Perce-Clearwater Forest, 2016). Having no substantial effects to cobble embeddedness would allow for the continued upward trend for fish habitat carrying capacity in all prescription watersheds.

In summary, there would be long-term (>50 years) positive indirect effects to listed and sensitive fish species as a result of the road-related sediment reduction activities previously discussed. No indirect effects from timber harvest, temporary roads, or log haul are expected to due to the implementation of design features and BMPs. Cobble embeddedness is not expected to measurably increase from management related activities and riparian areas would continue to function naturally from a lack of activities within them. The action alternatives would allow for the continued upward trends in habitat capability in project area prescription watersheds. There would not be an effect to Wild and Scenic ORVs for fish, because fish would not be impacted by the proposed activities since there would not be an increase in cobble embeddedness or loss of riparian areas or aquatic habitat from the activities.

3.5.7 Cumulative Effects

The cumulative effects analysis is conducted on the following subwatersheds: Big Smith Creek-Middle Fork Clearwater River, Goddard Creek-Selway River, and O’Hara Creeks. Any scale larger than these would dilute the effects of the project to non-measurable amounts. Johnson Bar activities are proposed on a maximum of 2% of the 28,875 acre Big Smith-Middle Fork subwatershed, 6% of the 22,725 acre Goddard-Selway subwatershed, and <0.1% of the 37,900 acre O’Hara subwatershed.

The timeframe considered for cumulative effects is 2015 to 2022. This timeframe includes potential sediment effects from road decommissioning or culvert replacements that have occurred since 2015. Sediment effects are expected to last no more than 2 years from project implementation due to revegetation of the disturbed sites within that timeframe. An additional 2 years was added as it is the expected amount of time it would take for shrubs and ground cover to respond after the last of the decommissioning activities occur. Local monitoring shows the growth of shrubs and other ground cover limits overland flow of sediment within this timeframe.

This analysis considers only those activities that affect stream crossings numbers or cobble embeddedness levels during the cumulative effects time frame as these are directly related to the issue indicators assessed above.

Grazing was not considered due to the limited amount of use in the project area and the effects to streams observed since 2010 in the Clear Creek portion of the allotment. There are 175 cow/calf pairs allowed in the allotment (average 250 acres per pair) with seasons of use between June 1 and October 30. Field observations by the project Fisheries Biologist noted limited trampling and forage of grasses in very few riparian areas. Reporting by the Range specialists indicate <5% bank disturbance from 2009-2012 (the allotment standard is <10%). Post season riparian use did not exceed the standard of <35% in all years monitored. Grazing does not appear to be contributing measurable sediment to streams in the allotment.

The Wash and Slide fires burned in 2015 but were not considered in the analysis as they occurred mostly outside of the analysis area. About 95 acres of the Wash Fire burned in the O'Hara Creek subwatershed (0.02% of the subwatershed). Field reviews in 2016 indicate a low to mixed severity burn and no sediment delivery to streams. The riparian areas were essentially unburned. An aerial flight in 2016 showed burned areas in both fires to be well vegetated with shrubs, forbs and grasses (Figure 21 and Figure 22). Riparian areas were mostly unburned. There was no evidence of surface erosion and only 1 landslide was noted in Meadow Creek (Wash fire). It occurred in a small unnamed drainage and contributed both wood and sediment to the creek. The slide was a natural occurrence and the amount of sediment delivered is unlikely to be detectable at the mouth of Meadow Creek. The mouth of the creek is 11 miles upstream from the project area. Sediment generated from the slide would not be detectable at the subwatershed boundary. The Slide fire had no obvious landslides and was primarily a low severity burn related to tree mortality. Sediment generated from either fire is expected to be minimal and would not likely be detectable at the subwatershed scale due to the large size and power of the Selway or Middle Fork Clearwater Rivers. With no evidence of large amount of surface erosion or landslides from either fire, the fires would not contribute to cumulative instream effects in the Selway or Middle Fork Clearwater River. Project related sediment input is expected to be negligible which would make cumulative effects undetectable.

Figure 21. Slide fire at Nineteen mile Creek after the fire in 2015

Figure 22. Slide fire at Nineteen mile Creek 1 year later in 2016

3.5.7.1 Alternatives 2, 3, and 4

Big Smith-Middle Fork Clearwater River subwatershed: Timber harvest was conducted on 270 acres of state lands in 2015 and would be conducted on 378 acres of federal lands in 2017/2018 in the Big Smith-Middle Fork Clearwater River subwatershed. The harvest is a result of the 2015 Woodrat Fire. Harvest included the retention of Forest Practices Act buffers on state lands and includes PACFISH buffers on federal lands. This provided for stream protection and minimized the amount of sediment entering streams from harvest activities. The cumulative harvest on federal and state lands totals 1,257 acres or 4% of the subwatershed. The combined Johnson Bar and Woodrat salvage projects would conduct road improvements on 45 miles of Forest roads which would help to minimize sediment delivery to streams. Roads used by the state for log haul in the Woodrat fire area did not cross water and were in place prior to the fire. They are not likely to contribute sediment to the Middle Fork Clearwater River due their locations in headwater areas and the lack of stream crossings to deliver sediment. A total of 4 culverts were replaced in the Woodrat Fire area in 2016. There would be a cumulative total of 6 crossing replacements in the subwatershed. The crossing replacements would reduce the risk of culvert failure and subsequent sediment delivery to streams. Cumulatively they would add about 24 pounds of sediment to the subwatershed (about 5 shovels full). This amount would not be measurable at the subwatershed scale.

Goddard-Selway subwatershed: Timber harvest was conducted on 350 acres of state and private lands in the Goddard-Selway subwatershed in 2014/2015 as a result of the Johnson Bar Fire. Harvest included the retention of Forest Practices Act buffers. This provided for stream protection and minimized the amount of sediment entering streams from harvest activities. The cumulative harvest is on federal, state, and private lands totals 1,820 acres or 8% of the subwatershed.

Sediment delivery to streams from harvest on state/private lands is not expected to be measurable based on field reviews of the harvested areas in Swiftwater and Elk City Creeks in 2016. There was no evidence of sediment moving through the units or the buffers due to thick ground vegetation and downed woody material within them (Figure 23 through Figure 28). No delivery is expected from harvest on federal lands due to PACFISH buffer retention. No mechanism for sediment delivery from roads used during state and private harvest was observed in 2016. Road 652 had 4 small stream crossings with little connectivity to the road. There were no stream crossings on the portion of Road 470 that was used for haul. Road improvements (culvert inlet cleaning, blading, graveling) were conducted on both of these roads prior to, and after, hauling activities were complete, thus limiting potential effects from log hauling. There are no cumulative effects from road decommissioning or road improvement since no other similar projects have occurred in the subwatershed. Annual road maintenance is conducted on Road 470 which maintains the road in a good condition and limits the effects of potential road surface erosion. Road maintenance, including graveling, would continue on this road.

Figure 23. Abundant woody material retained in IDL post-fire harvest after site preparation burning in 2015

Figure 24. IDL post-fire harvest buffer conditions in 2016 with abundant vegetation, Swiftwater Creek

Figure 25. IDL Buffer on Burnt Creek at Road 652

Figure 26. Buffer on private lands (Elk City Creek) has fewer trees than IDL section; there were minimal trees within the buffer that could be retained compared to IDL

Figure 27. Buffer on private lands (Elk City Creek) has fewer trees than IDL section; there were minimal trees within the buffer that could be retained compared to IDL

Figure 28. Post-harvest buffers on state and private lands (2016) harvested after the Johnson Bar fire

O'Hara Creek Subwatershed: The only projects considered for cumulative effects in the O'Hara Creek subwatershed are the 4 culvert replacements on Road 651 that were replaced in 2015. The crossing replacements reduced the risk of culvert failure and subsequent sediment delivery to streams. There would be 11 crossings removed as a result of road decommissioning under the Johnson Bar Project. Cumulatively the projects would add about 60 pounds of sediment to the subwatershed which would not be measurable at the subwatershed scale. There would be no cumulative effects from timber harvest since no other harvest has occurred within the timeframe.

Overall Subwatershed Summary: The cumulative effects of the project on stream crossings would be positive in the Big Smith-Middle Fork Clearwater River and O'Hara Creek subwatersheds. A total of 11 crossings would be replaced with larger sized culverts and 70 culverts would be removed. Cumulatively sediment would be added to the subwatersheds but is expected to be undetectable at that scale. Road improvement projects would also contribute to positive cumulative effects to sediment in Big Smith-Middle Fork and O'Hara Creek by minimizing sediment delivery to streams.

Timber harvest and temporary road construction in all three subwatersheds is not likely to contribute to negative sediment effects due to streamside buffer retention. Recent surveys of those buffers and roads showed no sediment delivery to streams. No cumulative effects to modeled sediment yield are expected. NEZSED sediment yield modeling included harvest on federal, state, private lands and showed modeled increases well below Forest Plan standards (see Hydrology section). Predicted changes in cobble embeddedness did not increase above 3% in Swiftwater Creek or 1% in Elk City Creek as previously discussed. This is well below 10% therefore no substantial changes in cobble embeddedness are expected.

3.6 Wildlife

3.6.1 Analysis Area

The project area includes 26,788 acres and supports various wildlife species. The latest fire has affected habitat for those species in the area.

The following wildlife section will show analysis on individual species that may be considered rare, or their population trend may be declining, and other species that represent wildlife in specific types of forest habitats. Direct, indirect, and cumulative effects consider a species occurrence in a project area, habitat requirements, habitat availability, and habitat quality for the analyzed species. In most cases, the direct, indirect and cumulative effects analysis area is the 26,788-acre project area which includes all proposed activity areas. It is large enough to assess the effects of proposed activities, but not so large as to make habitat changes undetectable.

For snag dependent species, the cumulative effects boundary is the Nez Perce National Forest, as such species are known to relocate where disturbance events have created new habitat. Effects were based on the acres of potential habitat treated by proposed activities. The timeframe for direct and indirect effects is 5 years (unless otherwise stated), which is the estimated time needed to complete harvest activities. Cumulative effects may range up to 150 years for stands to develop mature or old growth characteristics that are preferred by some of the wildlife species analyzed in this report. For old-growth and elk, predetermined analysis units were used as required by Regional or Forest Plan direction. There are 6 old growth analysis areas and 3 elk analysis areas (EAAs) in the analysis area.

3.6.2 Regulatory Framework

3.6.2.1 Nez Perce National Forest Plan

The 1987 Forest Plan documents goals, objectives, standards, and guidelines for managing Forest wildlife species and habitats. Goals (pages II 1-2) described in the Plan include:

- Provide/maintain diversity and quality of habitat to support viable populations of wildlife. Support the recovery of ESA listed species or sensitive species by providing habitat of sufficient quantity and quality.

The Forest Plan objectives (pages II 5-6) are more specific to acres managed for elk, Pacific yew and old growth. Specific wildlife species that were considered rare in the late 1980’s were addressed with forest compliance in their recovery. Habitats are to be managed to provide for population viability of sensitive species. Forest Plan standards and guidelines for wildlife (pages II 18-20) outline management, coordination, cooperation and some design considerations that the wildlife program would implement or comply to.

Wildlife associated with river habitats was identified as an Outstanding Remarkable Value (ORV) in the Middle Fork Clearwater Wild and Scenic River plan. This ORV would be maintained and enhanced for this project by complying with direction to retain suitable habitat for these species. The individual species are analyzed in this section and none were projected to be adversely impacted by the action alternatives. By retaining suitable habitat, the project would maintain and enhance the wildlife ORV.

3.6.2.2 Endangered Species Act

This act directs that actions authorized, funded, or carried out by federal agencies do not jeopardize the continued existence of any threatened or endangered species, or result in the adverse modification of habitat critical to these species. It is also the responsibility of the Forest Service to design activities that contribute to the recovery of listed species in accordance with recovery plans developed as directed by the ESA (50 CFR part 402). Section 9 of the ESA of 1973, as amended, requires threatened and endangered species be protected from "harm" and "harassment" wherever they occur, regardless of recovery boundaries.

The latest list of threatened and endangered species (September 15, 2016) shows the Canada lynx as the only listed (threatened status) terrestrial species on the forest. The analysis area of the salvage project is not located in any lynx habitat or in a Lynx Analysis Area (LAU). Thereby, no lynx habitat would be impacted by project activities. It is determined that all proposed alternatives for the Johnson Bar Salvage Project would create no effect to lynx or its habitat. All Action Alternatives are consistent with the Northern Rockies Lynx Management Direction (NRLMD, USDAFS 2007) and are in compliance with the ESA and FSM 2670. Informal coordination with the USFWS on this Project was initiated on December 2, 2014.

3.6.2.3 National Forest Management Act (NFMA, 1976)

This act requires the Forest Service to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives (16 USC 1604(g)(3)(B)). The Forest Service's focus for meeting the requirement of NFMA and implementing its regulations is on assessing habitat to provide for diversity of species. All alternatives would be consistent with NFMA direction for diversity of animal communities. Although the Action Alternatives analyzed in the Project may impact individual animals, the Project's proposed activities would not affect the viability of any species across its range.

Sensitive Species: Sensitive wildlife species are those that show evidence of a current or predicted downward trend in population numbers or habitat suitability that would substantially reduce species distribution. Federal laws and direction applicable to sensitive species (SS) include the NFMA and FSM 2670. The Forest is required to determine the potential effect of proposed activities on SS and to prepare biological evaluations. The Forest Service is bound by federal statutes (ESA, NFMA), regulations, and agency policy (FSM 2670) to conserve biological diversity on NFS lands and assure SS populations do not decline or trend toward listing under the ESA. This document fulfills the requirements of the biological evaluation for sensitive species. The Proposed Actions would not affect sensitive species viability on federal lands, nor would it cause SS to become federally listed as threatened or endangered.

Species Viability: The Proposed Action, in combination with past, present, and reasonably foreseeable future management actions in the Analysis Area, would not affect population viability or distribution of native and desired nonnative vertebrate species on the Forest. The Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2015) contains information on species of concern or interest including range-wide and state-wide status and known population information. At the Forest-wide scale, this Project would not disturb, agitate or bother populations to a degree that causes, or is likely to cause, a measurable decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior.

3.6.3 Analysis Methodology

Wildlife analyzed for management actions on the forest include Threatened and Endangered species (identified by the USFWS), Regional sensitive species, management indicator species (MIS) and neotropical migratory birds. The Nez Perce forest has one threatened species, Canada lynx, which is presumed to be on the forest. The USFWS recognizes the Forest as secondary habitat for the predator, as well as unoccupied habitat for threatened Canada lynx. The Nez Perce Forest Plan designated 11 management indicator species (MIS). The Forest Service Northern Region (R1) has identified 22 sensitive species (SS) that are suspected or known to be on the Forest. Wildlife analyses include the baseline conditions (created by all past management practices and natural events); direct, indirect and cumulative effects of the proposed actions; and cumulative effects of reasonably foreseeable projects. Region, Forest, local, and Idaho Fish and Game records were consulted on presence of species in the Project area.

3.6.3.1 Models and Surveys

Stand exam data from FSVeg would be the preferred data source for vegetative information in the development of wildlife habitat models; as it represents an accurate documentation of the vegetation within a specific stand location at the time of the exam. However, for reasons mentioned above, stand exam coverage is not complete for the entire Forest. To address gaps in FSVeg data availability within the Project Area the Biologist utilized the Region 1 Existing Vegetation Mapping Program (V-Map 2014): a vegetation model produced to provide a Forest wide geospatial database of existing vegetation.

"VMap is a remote sensed product which uses a combination of satellite imagery and airborne acquired imagery. The image data (i.e., pixels) are put through a process of aggregation to derive spatially cohesive units (i.e., polygons). A small portion of these polygons are then sampled through aerial photo interpretation and field data collection to determine their composition and through spatial statistics, unsampled polygons are given labels based on an analysis of the sampled polygons. Draft map products are then field verified and appropriate changes are made in the labeling algorithms. Final results are then used to populate the VMap base-level feature class. A variety of post-processing algorithms are then used to create the mid-level feature classes of the VMap database." (Brown and Barber 2012).

The BARC (Burned Area Reflectance Classification) model was used for post-fire assessment by BAER (Burned Area Emergency Response) teams. Information and a disclaimer on this model is found in the cited literature (Parsons 2003). This tool provides an initial image reflectance of fire-caused changes to soils by a satellite, and had not been ground verified. The Biologist employed this model to demonstrate the mosaic of fire severities that occurred in the Johnson Bar Fire. It under-estimated the more severe fires (moderate and high), due to the tree canopy (both dead and alive) that shielded the soil reflectance during the satellite passes over the period of fire suppression efforts. After the fire was out, field surveys were conducted in all proposed units for this project. Therefore, placement of units were in areas that burned with ≥ 50% mortality. The Biologist refers to the BARC model in his analysis of wildlife species as a reference. Overall, the Forest incorporates information derived from a range of scientific research, observed evidence, and model projections utilizing the best data available at the time. Despite this, uncertainty is inherent in all scientific results. However, it is felt that this combination is the most valid approach for wildlife analysis until proposed or future models and/or field techniques are verified.

Table 31 displays the habitat criteria used to identify suitable habitat for most species. Suitable habitat considered includes areas that would be necessary for breeding, nesting, rearing, and foraging activities. Suitability is based on stand characteristics such as tree species, tree size, and tree canopy cover. Other habitat quality considerations include patch size, snag numbers and size, downed wood, riparian habitat, and security areas. Stand criteria used to assess species' habitat suitability were obtained from peer-reviewed technical literature on species specific research. Some species are not necessarily dependent on coniferous trees for their habitat needs: American peregrine falcon, black swift, Coeur d'Alene salamander, common loon, harlequin duck, long-billed curlew, North American wolverine, and Townsend's big-eared bat. These species are not described in the following table.

Table 31. Habitat criteria used to identify suitable habitat for species

Wildlife Species	Primary Tree Species[a]	Tree Diameter (inches dbh)	Tree Canopy Cover (%)	Age Class (years)	Suitable Habitat (Acres)
Canada Lynx (Threatened)	Denning Foraging	N/A	N/A	N/A	0 0
American Marten	SAF, S, LLP, GF, WRC	>10	>40	>100	14,245
Bald Eagle	All mature Species, near open water	>20	20-60	>100	3,648
Bighorn Sheep	All Species w/ openings	N/A	N/A	N/A	0
Black-backed Woodpecker	PP, DF, WL, LPP, S, GF, WRC: diseased or burnt	>10	>40	>40	11,818
Flammulated Owl	PP, DF	>12	35-70	>80	854
Fisher	Updated models of prob. of occurrence	N/A	N/A	N/A	1,225
Fringed Myotis	PP, DF	>12	<80	>100	1,458
Gray Wolf	All	N/A	N/A	N/A	26,000+
Long-eared Myotis Long-legged Myotis	All Species	>12	<80	>100	2,404
Mountain Quail	All Habitats in VRU 3	N/A	N/A	N/A	0
North American Wolverine	Modelled primary habitat	N/A	N/A	N/A	0
Northern Goshawk Nesting	PP, DF, WL, LPP, GF, WWP	>13	>35-70	>50	11,649
Pileated Woodpecker Nesting	PP, WL, DF, WWP, GF, WRC	>15	>15	N/A	1,664
Pygmy Nuthatch	PP	>15	25-60	>80	20
Ringneck Snake	VRU 3	N/A	N/A	N/A	192
Western Toad	RHCAs	All	<30	N/A	4,621
White-headed Woodpecker	PP	>15	25-40	N/A	0.5

Wildlife Species	Primary Tree Species[a]	Tree Diameter (inches dbh)	Tree Canopy Cover (%)	Age Class (years)	Suitable Habitat (Acres)
Shiras Moose Winter (MA 21)	Mapped MA 21	N/A	N/A	N/A	768

[a] PP- ponderosa pine; DF- Douglas-fir; WL-Western larch; WWP-Western white pine; LPP- Lodgepole pine; GF- grand fir; WRC- Western redcedar; S- Englemann spruce; SAF- Subalpine fir

Habitat status and population viability at the Forest level is presented for some species based on Forest Service Northern Region analyses (Samson 2006; Bush and Lundberg 2008). This provides a broader scale context relative to the Analysis Area.

This analysis uses the best available science to assess effects. Data related to vegetative features model potential habitat, including species, age, size, density, canopy cover, and harvest history were taken from the various databases. ArcMap GIS was used for modeling, mapping, and quantifying habitats and Project impacts. National Agricultural Imagery Program (NAIP) images were used to validate information gathered from other sources.

The Idaho Comprehensive Wildlife Conservation Strategy (ICWCS 2015) is a storehouse of sensitive or rare wildlife species survey and observation data. ICWCS data was mapped within the Project area boundary to identify sensitive species potentially using the Analysis area. Some of the IDFG maps were last completed in 2005. Additional wildlife sightings from federal and state historical records were used in this section.

Population trend information for elk and wolf was synthesized from data available from the Idaho Department of Fish and Game research reports.

This analysis incorporates the effects on terrestrial sensitive species and fulfills the requirements of the required Biological Evaluation, per direction pertaining to the FSM and streamlining process (USDA Forest Service 1995). The streamlined process for doing biological evaluations for sensitive species focuses on the following two areas:

- Incorporating the Effects on Sensitive Species into the NEPA Document
- Summarizing the Conclusions of Effects of the Biological Evaluations for Sensitive Species

The following Regional Forester sensitive species and MIS may occur or be affected by proposed activities in the Project area: American marten, bald eagle, black-backed woodpecker, flammulated owl, fringed myotis (bat), gray wolf, long eared myotis, long-legged myotis, northern goshawk, pileated woodpecker, Rocky mountain elk, and Shiras moose.

3.6.4 Species Dropped from Detailed Analysis

The following species were dropped from detailed analysis as suitable habitat is not present, or the project would not affect individuals or their habitats: American peregrine falcon, bighorn sheep, black swift, Canada lynx, Coeur d' Alene salamander, common loon, fisher, grizzly bear, harlequin duck, long-billed curlew, mountain quail, north American wolverine, pygmy nuthatch, ringneck snake, Townsend's big-eared bat, yellow-billed cuckoo, western toad and white-headed woodpecker. Appendix G – Wildlife Eliminated from Detailed Analysis includes a table displaying these animals and the reasons why they were not further analyzed.

3.6.5 Environmental Consequences

Past disturbances that have affected the vegetation in the project area prior to the Johnson Bar fire include historic wildfires from 1880 to 1945. These fires ranged in size from a hundred to 9,000 acres (Appendix B). The Johnson Bar Fire re-burned over many acres of historic fire events. About 5,770 acres of historic fires were not affected by the recent 2014 fire. In the areas affected by these older fires, trees would be 70 years or older: provided no other disturbances since the fires occurred. Trees of this age or older would be at a mature stage, and offering complex habitat for fisher, goshawk, pileated woodpecker or marten. More recent wildfires (1992-2015) burned about 12,215 acres in the Project area. Adjacent fires of 2015 included the Wash Fire (about 22,011 acres burned) and the Slide Fire (about 7,481 acres burned). About 14 acres from the Wash Fire burned within the Johnson Bar Project Area. The more recent fires of 2014 and 2015 created habitat for wildlife species that prefer more open areas or areas in post-fire recovery. Examples of species that would benefit from such disturbance are the black-backed woodpecker, pileated woodpecker, other woodpeckers, some raptors and songbirds. As early successional vegetation recovers, small mammals and big game would move in to forage on the new growth.

Past timber harvests (clearcut, seedtree or shelterwood, and salvage) affected about 5,884 acres in the project area. Harvest (2,980 acres) and other disturbances that occurred more than 30 years ago would now be supporting a young forest of pole size (4”=>12” dbh) or larger trees. The size and canopy structure of these recovering forests would provide hiding cover for big game, forage for small mammals and a prey base for fisher, marten, wolf, and goshawk. The tree boles and structure are not likely to support large nests or cavities for pileated woodpeckers, goshawks or roosting for bats. Harvest activities occurring in the past 30 years would have units ranging from seedlings to near pole size trees. Big game forage would be available in the younger stands, while hiding cover would be present in the older cohorts of this age group. More open areas and the young forest would provide habitat for species that prefer such: some songbirds, small mammals, and invertebrates. Commercial thinning and pre-commercial thinning projects occurred in areas that were previously harvested, so these are not new acres of disturbance. Both thinning treatments would reduce competition and fuel loads for the trees that are retained in the units. Hiding cover for big game would remain in small patches. Large trees and some snags would be retained, providing some potential habitat for birds, bats and small mammals.

All trail or road construction and decommissioning projects created some disturbance to wildlife adjacent to and during the period of the activities. New roads impacted wildlife by loss of some habitat, while the obliteration of roads has allowed habitat to recover for some species. The last new road construction occurred in the 1990s; however, decommissioning of roads is ongoing across the Lochsa and Moose Creek Ranger District of the Forests.

A portion of the Project area lies within the Tahoe –Clear Creek cattle allotment. This ongoing permit allows 70 cow/calf pairs to graze on the forest from June through September each year. The impacts of cattle (presence, competition for big game forage) are analyzed for elk habitat effectiveness. The permit also defines limits to allowable use by cattle of riparian and upland areas. Most of the wildlife analyzed in this document would not be affected by cattle presence.

3.6.6 General Effects to Wildlife

The 2014 Johnson Bar fire burned with mixed severity in the affected area. Fire models and field surveys show a mortality rate for trees ranging between 10-100%. Areas that burned at low fire intensity likely retained more vegetation and structure than areas of high intensity (such as stand replacing fires). Overall, the burned areas have altered the composition of wildlife communities.

Fires may create short-term increases in food that may contribute to population increases of some wildlife species: an increase of species depends on the animals' ability to succeed in the altered post-fire environment (Smith 2000). When fire frequency increases or decreases substantially or fire severity changes from presettlement patterns, habitat for many animal species declines. (Smith 2000).

Huff and Smith (in Smith 2000) noted one mixed-severity burn that showed less bird species turnover than the stand-replacement burn in the first 2 years post-fire. Some birds typical in unburned areas occurred in the mixed severity burn, but were absent from the stand-replacing burn. An increase in seed-eating bird species after crown fires is related to the available seeds from cones that have opened from response to the fire (Hutto 2006). Another study showed that after mixed-severity and stand-replacement burns in central Idaho, seed-eating birds were the most abundant songbirds (Saab and Dudley 1998). Raptor populations remained neutral or responded favorably to burned habitat as prey became more exposed to predation as their hiding cover was reduced (Lyon et al. 2000). As the vegetation recovers during the post fire period, raptors benefit from the increase in prey that forages on the regenerating vegetation.

Ream (1981) reviewed about 240 references on small mammals and fire. She concluded that populations of ground squirrels, pocket gophers, and deer mice generally increase after stand-replacing fire. Rabbits, snowshoe hare, red squirrel, northern flying squirrel, and voles generally avoid recent stand replacement burns (Ream 1981). Recent burns can increase food and nutrition for ungulates over the short-term (3-20 years). Lyon et al. (2000) noted that "ungulates are sensitive to alterations in vegetation structure, and their net response to fire depends on its severity and uniformity. Moose also rely on seral shrubs in many areas, especially where shrub-fields are interspersed with closed-canopy forest. Large carnivores and omnivores are opportunistic species with large home ranges. Their populations change little in response to fire, but they tend to thrive in areas where their preferred prey or forage is most plentiful—often, in recent burns."

Fire-caused changes in plant species composition and habitat structure influence reptile and amphibian populations (Means and Campbell 1981; Russell and others 1999). Amphibians in forested areas are closely tied to debris quantities—the litter and woody material that accumulate slowly in the decades and centuries after stand-replacing fire. (Lyon et al. 2000).

3.6.7 Effects Common to Analyzed Species

Old growth in the Project Area was calculated by adding MA 20 (designated old growth) and verified old growth (ground surveys that confirmed old growth) for a total of 2,884 acres. The Johnson Bar fire burned 950 acres of old growth at moderate to high severities, thereby compromising much of the characteristics that contribute to a stand's status as old growth. Therefore, an estimated 1,934 acres of old growth are present for consideration as habitat for certain species that utilize older or mature forests in the project area.

Timing of project activities is planned for year-round up to the end of 2020. Any concerns from wildlife and other resources that are addressed in the design criteria would alter timing of planned activities, and would be incorporated into the planning and implementation of the timber contract. Examples of such concerns would be soil conditions, fog, active bald eagle or northern goshawk nests, and so on.

Common effects from the action alternatives to the following analyzed species would be potential disturbance from project activities. This would include noise from machinery and other human activities. Those species dependent on current habitat may be displaced to other areas by the proposed activities. Other species may move to unharvested areas during daylight hours and return during hours of darkness. The latter species may continue to visit units between the time periods of different activities. Upon completion of the activities (roadwork, timber harvest, prescribed burning, tree planting) in the units, some wildlife species would return as soon as the following vegetation growing season. The time frame of return depends on the species and its preference for the various stages of vegetative succession that would occur over time.

All harvested units would be planted with native tree species found on the forest. An additional 429 acres of tree planting would occur outside of units for soil retention and reforestation. The advantage of tree-planting is that trees and their root systems would become established and contributing to the nutrient cycle, adding stability to soils and reducing erosion or sediment loss. Yes, under natural regeneration the above benefits are present, but it may take 5-20 years later for this to occur. During such a lag period, soil loss is imminent from erosion and loss of nutrients. Wildlife would not return to the affected areas until the vegetation component is there to provide habitat for them.

Recently completed projects include activities generated by private and state interests. One private land owner salvaged 80 acres of his land in 2014; while another salvage harvested 120 acres in 2015-2016. The state (IDL) salvaged about 170 acres of their land in 2015.

Forest projects recently completed or ongoing include the O'Hara campground hazard timber sale (2014: removal 30 dead trees), the Lodge Point Stewardship Sale (2016: CT 598 acres, road decom.), Road 101 Roadside Hazard (2016: 46 acres along road), and timber harvest in the Iron Mountain Stewardship. The latter project will be complete when the tree planting and road decommissioning is done. These operations likely created disturbance to terrestrial wildlife in or near the affected units. Some wildlife individuals may have been displaced to areas on the national forest. Loss of snags in the campground or salvage projects would have reduced potential snag habitat for cavity dwellers or birds of mammals that forage in snag habitat. Newly harvested areas would provide understory forage for big game and small animals. As such wildlife species move in to feed on the grasses, shrubs and herbs, predators would soon follow to take advantage of the increase of prey in these affected areas.

Reasonably foreseeable projects that are adjacent to this project include 3 timber/salvage sales (Clear Creek Integrated Restoration, Lowell WUI, and the Wash Roadside Hazard). All three projects are in the various NEPA planning stages; with the earliest potential of implementation being in summer of 2017. Clear Creek project proposes to conduct fuels (1,371 ac) and timber treatments (8,000 ac) in an area adjacent to Johnson Bar Project Area. Lowell WUI would harvest about 160 acres for reducing fuels near private property along rivers and the town of Lowell. The Wash Roadside Hazard would reduce about 91 acres of hazard trees along roads that were affected by the Wash wildfire. The latter two projects are adjacent to the Johnson Bar Project Area.

Two prescribed fires have been planned in the past year or two. The Fenn Face and North Selway were planned to reduce fuels and wildfire threats alongside or upslope of the Selway

Road and all human settlements. The effects of the Slide and Wash Fires may put into question the need to do further fuels reduction along the Selway River for a time period.

Fire suppression is the foreseeable management action that would occur in the project area that could affect species habitats. Cumulative effects would vary among the analyzed species, as each has needs for various stages of vegetative growth and structure. Generally, short-term effects vary by species, and long-term effects would range up to 150 years: the time span for a tree seedling to grow to a mature or old growth status. All past activities are considered as part of the existing condition, including those activities on private and state lands. The state's activities were evaluated by the Idaho's guidelines for analysis on wildlife that may occur in their project area. Logging operations on private lands must abide by the Idaho State Forest Practices Act. Wildlife in the state and private lands that were affected by harvest operations may have been displaced to federal lands.

Some of the projects mentioned in Appendix E – Activities Considered for Cumulative Effects would not likely impact wildlife in this project area. The Woodrat Fire Salvage and 101 Roadside Hazard projects occur north and west of the Johnson Bar area, and are separated by a moderately-sized river, the Middle Fork Clearwater River. Beside the river runs a highway and occupied human settlements. Though animals may disperse across the river (as evidenced by road kill), it would be more likely for wildlife to move to adjacent unburned areas near the fire where less energy and risk is expended, as opposed to swimming a river and negotiating human presence and motorized vehicles.

3.6.8 Region 1 Sensitive Species

3.6.8.1 Bald Eagle

The bald eagle is one of the largest raptors in the U.S., and is mostly found in habitats adjacent to large water bodies: rivers, lakes, and seashores. The eagle is an opportunistic predator which subsists mainly on fish, but it may hunt waterbirds (duck, herons, seabirds), small mammals and reptiles. It also scavenges dead animals, and has been detected on carcasses of deer and other small mammals during winter bald eagle surveys on the Central Zone of the Nez Perce-Clearwater National Forest.

Eagle populations had declined in the twentieth century to a point where the bird was listed on the endangered species list in 1978. After conservation and management efforts began to show an increase in populations, the eagle was determined as "recovered" and removed from the list in 2007 (USFWS Federal Register 2007). It is on the Region 1 sensitive species list (February 2011).

For nesting, the eagle selects a dominant or codominant tree that is in proximity to a large water body. The tree species is less important to the eagle pair than the tree's height, composition and location (Suring 2013). Roost trees (mature trees with strong limbs and well-developed canopies) are also used during winter as groups of eagles gather to forage, perch and provide security to one another (IDFG 2008).

The most sensitive time for disturbance of eagles, as is all birds, is during the nesting period. Therefore, management guidelines put restrictions on some human activities during the nesting period of January to mid-August. Additionally, recommended management zones range from 0.25 to 2.5 miles from the nest. The zones define the space and privacy for a nesting pair, and the size and shape of the radius around the nest is influenced by topography, vegetation and food sources (IDFG 2008).

Population Trends: Range wide status of the bald eagle is apparently secure (G4/G5) and statewide status indicates it is vulnerable during breeding, and apparently secure during nonbreeding season [S3B/S4N] (CWCS 2011). Breeding Bird Survey trend data show the eagle population increasing by 4% in the western part of the country during the period of 1966 to 2013 (Sauer et al. 2014). The raptor is a sensitive species and MIS on the Nez Perce Forest. Currently, no bald eagle nests have been recorded along the boundary of the project area. Annual winter surveys since 1980 have shown presence of eagles along the boundary of the project area.

Affected Environment

There are approximately 4.5 miles of the Middle Fork Clearwater River and 7 miles of the Selway River that flow along the boundary of the project area. Estimated potential bald eagle habitat is approximately 3,650 acres. Eagle nesting and winter foraging activities have been observed along the Project Area boundary. In 2016, the Biologist observed occupation of 2 nests by adult eagles in spring. One nest along the Middle Fork Clearwater River was seen by numerous agency personnel though spring to mid-summer. The other nest, located along the Selway River, was occupied until July. Neither nest was damaged, but in mid-summer the adults were no longer sitting in or near either nest. No fledglings were detected, yet in September the Biologist observed adult eagles along both stretches of the rivers.

In 2015, the nest along the Selway River was detected, and occupied by two adults until mid-July. There was no nesting success for this nest. Another observation detected a pair of eagles on a nest about one and a half miles west of the project boundary in 2014. Three eagles were seen along the Middle Fork Clearwater River and boundary of the project area during the 2015 winter bald eagle count. One eagle was observed in the project area (near present J-Bar unit 145, about ½ mile from river) during 2013 by a forest wildlife crew.

The Johnson Bar event was a mixed severity fire. Most of the burned areas near the rivers were low to moderate severity, but some isolated patches of high severity occurred. The latter intensity would kill all the trees, leaving snags, scorched soil, and openings as the snags fall over in time. The low intensity burns would have reduced grass, shrub and small tree species. Areas affected by moderate severity burns may have some remnant understory and mixed tree species that survive. Most of the surviving trees would be of larger size with thicker bark. Eagles would be able to use the surviving trees in low or mixed burns for perching, and the largest trees to support a nest.

Direct and Indirect Effects

All action alternatives propose to salvage harvest in the project area. Large trees and/or snags would be left in all units as per the target stand prescriptions. No harvest would occur in the RHCAs buffering the rivers.

Ground based logging (tractor or skyline) would create noise or activities that may disturb eagles. Harvest in units would be at least 200 yards from the rivers’ edge; leaving burned or unburned vegetation between the river and project activities. Foraging eagles may relocate their perch sites and hunting activities along other river stretches during activities in units that are visible to the bird(s). However, eagles appear to be somewhat tolerant of mechanical noise as traffic along Highway 12 has been occurring for decades. Any active nest(s) in the area and any others that are detected prior to or during activities would be accommodated by buffer distances and timing restrictions found in the project design criteria (Chapter 2).

Helicopter logging would create impacts on eagle activities. Two studies detected that 36% to 11% of bald eagles were flushed from their nests when helicopter distances were between 490 - 2,190 yards away (Watson 1993). The author points out that disruption of nesting activities by aircraft may cause reduced breeding and feeding of the young, which may lead to diminished attentiveness and nest failure. The article primarily focused on helicopter presence/activity around eagle nests, but foraging eagles during the winter period may also be displaced by helicopter activities.

The potential eagle habitat in the project area that may be affected by proposed activities was calculated as all area within one half-mile from the rivers' edge/bank. This distance is considered as the primary use area of a bald eagle's nest. Alternative 2 would impact approximately 395 acres, Alternative 3 (301 acres) and Alternative 4 (152 acres). Both Alternatives 2 and 3 propose four helicopter landing sites adjacent to the rivers: two along the Middle Fork Clearwater River, one at the confluence of the Middle Fork and Selway Rivers, and one along the Selway River.

The harvest salvage would not affect eagle nesting habitat. The units are too far inland to offer perch sites along the rivers, and all live and large trees would be retained. Potential nesting trees remain abundant along the rivers and were largely unaffected by the wildfire. Timber salvage within the buffer would remove dead trees, opening the area up for potential eagle scavenging opportunities on carcasses that may occur in the areas.

Potential affects from the action alternatives would be noise and disturbance. All action alternatives would include helicopter activity encompassing noise, low flight altitudes above the tree canopy and repetitive trips across the rivers during daylight hours. Any known active nest would be protected from logging activities and timing restrictions would curtail harvest activity within 2.5 miles of the nest to a period when the eagle nest would not be occupied. The same would apply to any more recently discovered nests in the project area.

Foraging eagles would likely be displaced from perching areas that are in or near the flight zones of helicopter activity. This displacement would not be long-term; rather the effects would last for the period required to complete the harvest of the units associated with the helicopter landing site. Estimated time span of disturbance would be year-round, for up to 4 seasons. Bald eagles that are affected would shift their foraging up or downstream along the river sections that are not being disturbed by rotary-wing activity. Upon conclusion of the helicopter activity, eagles would resume occupancy of perches and foraging areas that were avoided during the periods of disturbance.

Cumulative Effects

The boundary for cumulative effects for the bald eagle is 25.4 miles of river habitat along the Middle Fork Clearwater River and the portion of the Selway River up to the Wilderness Boundary. Timeframe is 80 years or greater, as trees of this age would potentially have the structure of large branches to support an eagle nest. A couple of historic fires (1945 and prior) did burn in some potential eagle habitat by the rivers. About 430 acres of these old fires were re-burned by the Johnson Bar Fire of 2014. The remaining 172 acres of old burns would have trees about 60 years or older. Any large trees of 80 years or older would offer potential eagle nesting habitat if they offer the structure that would support a nest.

Private and state salvage harvests were conducted adjacent to the Selway River. About 200 acres of such harvest occurred in areas the eagle would use for perch sites while foraging. However, the salvaged trees had lost any potential structure for nesting due to the fire.

Concerning federal projects (past, ongoing or foreseeable projects), the Lowell WUI Project would not impact potential eagle nesting habitat, but proposed activities would disturb an eagle that would be foraging in the area. The same would be true for the prescribed burns proposed along the Selway River.

Alternatives 2, 3, and 4 would generate disturbance (noise, human and machine activity) from the proposed activities of timber harvest. Alternative 2 would harvest approximately 11% of potential eagle habitat, while Alternative 3 would affect about 8% and Alternative 4 would impact about 4%. Alternative 4 has no helicopter landing sites proposed along the rivers. Alternatives 2 and 3 propose 3 such sites. Helicopter operations involving these landings along the rivers include flight paths and aerial traffic that may disturb and flush bald eagles from perch and foraging areas that lie in, or are adjacent to the activities. Foraging eagles that are disturbed by aerial operations would re-locate their presence to areas not affected by such. Upon completion of the harvest activities occurring along the rivers, eagles would resume using the areas that they were temporarily displaced from. The effects of the fire salvage project from Alternatives 2, 3 and 4 *may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species* of bald eagle.

3.6.8.2 Black-backed Woodpecker

The black-backed woodpecker is a Nez Perce Forest sensitive species. The woodpecker's primary food source, woodborer beetles and their larvae, are most abundant within burned forests. In unburned forests, woodborers and bark beetles are found primarily in areas that have undergone natural disturbances, such as wind-throw, and within structurally diverse old-growth forests (Bull et al. 1986, Goggans et al. 1988, Hoffman 1997). Black-backed woodpeckers occur at highest densities in one to eight-year-old burns, which provide an abundance of snags for nesting, and large numbers of beetles and other wood-boring insects for feeding (Dudley et al. 2012, Dudley and Saab 2007, Hoyt and Hannon 2002). Burned forests are believed to act as source habitats from which birds emigrate once post-fire conditions become unsuitable. Nappi and Drapeau (2009) found high nest densities and reproductive success in a severely burned spruce forest. As the surviving tree tissue declines over time, the dependent beetles depart. Black-backed woodpecker nest success declines, and the bird moves on. Old forests may produce an insect food source that allows woodpecker populations to persist between fires in regions with long fire intervals. Hutto (2008) also found black-backed woodpecker presence was primarily influenced by the occurrence of high severity burn patches.

After stand-replacing fires, forests consist almost entirely of standing dead snags. Within weeks to months after the fire, these snags are colonized by wood-boring beetles which attract woodpeckers. In a western Montana study of salvage-logged and unlogged recently burned forests, Hejl and McFadzen (1999) found that over 75% of the nests of black-backed woodpeckers were located in the unlogged portions of burned forests. In southwest Idaho, during the first five years after a fire in ponderosa pine/Douglas-fir forest, four pairs of black-backs consistently nested in a 1,200 acre unlogged area, and another four nesting pairs nested in a different 1,200 acre unlogged area (Dixon and Saab 2000). Goggans et al. (1988) recommend that in recently fire-disturbed areas, 30-50% of burned acres be retained, depending on the size of the fire, in large, contiguous and interconnected blocks, in order to provide sufficient habitat for black-backed woodpeckers.

Population Trends: According to NatureServe, the black-backed woodpecker is globally ranked as a G5 (globally secure), with state ranks of S3 (vulnerable) in Idaho (NatureServe 2006). In Region 1 of the Forest Service, the black-backer woodpecker is considered a sensitive species (2011). Regional conservation assessment estimates 716,185 acres (38%) of potential habitat on the Nez Perce Forest (Bush and Lundberg 2008). No records of black-backed woodpecker detection have occurred in the project area prior to the Johnson Bar fire.

Affected Environment

The Johnson Bar fire burned in or around 13,250 acres of forest habitat. A spot from the Wash Fire burned another 14 acres within the project area boundary. The burn severity layer model (BARC) for GIS shows about 11,818 acres in the low to high burn intensities. Moderately burned areas comprise 5,789 acres and severely burned areas were in 527 acres. Moderate burns would kill trees: scorching the bark and leaving brown tree needles, an indicator of a dead or dying tree. Not all trees are killed, but pockets of those that endured intense heat provide potential habitat for the black-backed woodpecker. Therefore, the recent fire would provide about 6,325 acres of potential habitat for this species.

Old growth stands are also considered as potential habitat for the woodpecker, due to the wood-boring insects that are attracted to dying trees and decaying wood in snags and downed woody material from wind or other elements. About 5,500 acres are in the project area.

Direct and Indirect Effects

All of the action alternatives propose to harvest in potential black-backed woodpecker habitat. Alternative 2 would salvage harvest 1,106 acres, Alternative 3 (838 acres), and Alternative 4 (666 acres). The alternatives would comprise removal of the following percentages of potential black-backed habitat: Alternative 2 (17%), Alternative 3 (13%) and Alternative 4 (11%). No harvest would occur in verified old growth stands. All of the action alternatives would retain over the 50% retention of burned areas recommended by Goggans et al. (1988).

Project activities would produce disturbance to the woodpecker. Noise and activities from ground or aerial logging systems are likely to cause woodpeckers to avoid the affected harvest units during operational periods. Unit harvests would not be conducted simultaneously. Instead, units would be grouped into timber sales that focus on time intervals to be completed for each sale.

Some black-backed woodpeckers may nest and forage in proposed units that are undergoing harvest operations. Some nests may be lost, creating a direct effect of injury or mortality to the young in the nest. Foraging woodpeckers may be displaced to other areas unaffected by logging operations, and may even return to harvested units after operations have been completed. Silvicultural prescriptions would leave a quantity of leave trees (large dead and alive trees) that would offer foraging and maybe nesting opportunities.

Cumulative Effects

The boundary for cumulative effects analysis in the Nez Perce Forest boundary as it represents a landscape that provides disturbance events which provide potential habitat for the woodpecker. Trees burned by wildfire events more than 8 years ago would likely lack the cambium layer to support large beetle infestations. The time frame for effects on the black-backed woodpecker in the wildfire landscape is 8 years. Therefore, the analysis for wildfires that occurred from 2009 to 2016 showed about 346,530 acres of potential black-backed woodpecker habitat.

Past projects involving road construction, decommissioning, maintenance and culvert replacements would not have impacted woodpecker habitat. PCT and commercial thinning would not impact habitat, as live trees are slashed or harvested. Also, recreational trail maintenance/use would usually remove fallen trees and some snags. The effects of this would be so small as to be immeasurable.

Fire suppression activities did reduce potential snag habitat. Handline (10.5 miles) and bulldozer or exactor built lines (5.3 miles) reduced potential habitat by 14 acres. Private and state salvage projects reduced habitat in the project area by 367 acres.

Adjacent projects would remove dead or dying trees: O'Hara Hazard (30 dead trees in a campground), and the Wash Roadside Hazard Project (91 acres of dead or dying trees along a road), and the Baldy Roadside Hazard Project (25 acres). Total loss of snag habitat adjacent to the Johnson Bar Fire salvage project area by fire suppression, state and private salvage, and Roadside Hazard Projects would be approximately 500 acres.

Other adjacent projects that would impact snags include the ongoing Iron Mountain Stewardship, and proposed Clear Creek Timber Sale, and Lowell WUI. As these latter projects are harvesting live and some dying trees, it is unknown what the percentage of potential habitat would be lost in the proposed 9,275 acres to be treated. Additionally, silvicultural prescriptions would retain live trees and snags in the range of 12-28 trees per acre, which may provide some foraging habitat for the bird.

Proposed fuel treatments (Clear Creek, Fenn Face, and North Selway) would create more snags in the 3,371 acres to be burned. Also, the nearby 2015 Woodrat, Wash and Slide fire added approximately 52,000 acres of new snag habitat.

The Johnson Bar fire created potential habitat for the black-backed woodpecker. Literature reviews and the mixed severity conditions in the burned areas lead the wildlife biologist to presume that black-backed woodpeckers would be present in the affected area for the next 1-8 years after the wildfire event. High-intensity burned areas would offer immediate food sources for beetles coming to the area; which likely began during spring of 2015. Moderately burned areas may continue to create food sources for beetles as trees die from stressed conditions (failing root systems, falling snags that damage bark and structure to living trees and so on). Therefore, these future declining trees will become susceptible to beetle attack, and forage for the black-backed woodpecker.

The action alternatives have potential direct effects (disturbance, fatality, displacement) and indirect affects (species avoidance during periods of project activities) to some individual black-backed woodpeckers. The action alternatives would reduce black-backed woodpecker potential habitat by 11-17%, depending on the selected alternative. Cumulative effects from other actions would or have reduced black-backed woodpecker potential habitat in the project area by 367 acres or less than 1%. However, the action alternatives would leave over 60% of potential habitat for the woodpecker unaffected by salvage operations. The latter habitat would provide forage, nesting and areas for displaced woodpeckers.

Projects adjacent to the Johnson Bar Fire Salvage project area would remove potential black-backed woodpecker habitat by 500 acres. Additional snags would be reduced with the ongoing Iron Mountain Stewardship, and proposed Clear Creek Timber Sale, and Lowell WUI. Snag loss would occur, but unit prescriptions would retain a snag component in all treatments. Proposed prescribed burns would create potential black-backed woodpecker habitat among the 3,371 acres planned for such treatment.

In summary, this project would impact at most 1,487 acres (23%) of potential black-backed woodpecker habitat within the project area: Alternative 2, state and private salvage sales and fire suppression. In comparison to habitat impacts to the woodpecker across the Forest, additional reduction of potential habitat from Iron Mountain, Clear Creek and Lowell WUI would be less than 9,000 acres and Roadside Hazard Projects would be approximately 500 acres.

With over 346,000 acres of potential black-backed woodpecker habitat available on the Forest, the combined Johnson Bar Fire Salvage project and other projects considered for cumulative effects to the black-backed woodpecker would total approximately 11,000 acres (an overestimation as live trees would be harvested and some snags left in the Iron Mountain, Clear Creek and Lowell projects). 11,000 acres of potential disturbance would create about a 3% reduction of black-backed woodpecker habitat over the Nez Perce Forest.

The effects of the fire salvage project *may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species* of the black-backed woodpecker.

3.6.8.3 Flammulated Owl

The flammulated owl is considered a neotropical migrant, nests in tree cavities and preys on insects (Hayward and Verner 1994, Powers et al. 1996, Nelson et al. 2009). The diet of this owl consists mostly of nocturnal moths and insects gleaned from open tree branches, taken on the wing, or picked up from the ground. Linkhart et al. (1998) observed in Colorado that 80% of intensive foraging areas were in old ponderosa pine and Douglas-fir mixed forest. The owl forages in stands with low stem densities, moderately open canopies (35-65%), and very open understories. However, flammulated owls use dense foliage for roosting (Hayward and Verner 1994). Roost sites may be found in multi-layered, mixed-conifer forests with a ponderosa pine or Douglas-fir component and pockets of dense foliage. Flammulated owl habitats in Idaho are typically mid-elevation mature or older open ponderosa pine and/or Douglas fir forest (IDFG 2005).

The owl prefers large snags with cavities (usually drilled by pileated woodpecker or northern flickers) for nesting (Smucker et al. 2008). Nesting territories are documented between 20-60 acres in size, but flammulated owls have been known to forage as much as 0.5 miles from their nest (Reynolds and Linkhart 1992). There is also some evidence to suggest that flammulated owls may form loose colonial groups or congregations for the purposes of breeding.

Population Trend: In Idaho, the flammulated owl has a state rank of S4 (apparently secure). There are no population trend data for Idaho. The owl is difficult to detect: it’s nocturnal, has secretive behavior, and low population densities. In 2005 the Forest Service conducted an extensive survey effort for flammulated owls across Montana and Idaho (Cilimburg, 2006). This effort yielded a total of 243 widely distributed owl detections. Sixty-nine owls were detected/heard on the Nez Perce National Forest, but none of these records were in the analysis area. However, the US Fish and Wildlife database shows one owl detected in the project area during 2000, and FS Region 1 records show one owl detected about 1 mile outside the project area in 2010. No scientific evidence exists that the flammulated owl is decreasing in numbers in the Northern Region of the Forest Service (Samson 2006).

Affected Environment

Approximately 854 acres of potential flammulated owl habitat was detected in the project area. This included the spot fires from the Wash Fire. The BARC model analysis showed the mixed severity fire burned in about 516 acres: 303 acres burned at moderate to high severities, leaving 213 acres of potential habitat in low burn or unburned areas.

Trees burned at higher severities would have lost most or all of their foliage. This condition would drop canopy coverage well below the threshold of overhead canopy the owl prefers; creating a loss of potential owl habitat. Areas that endured less fire severity and retained a tree canopy among Ponderosa pines and Douglas-fir would still provide potential habitat for the owl.

The result is about 5,213 acres in the project area that still maintain habitat for the flammulated owl.

Direct and Indirect Effects

All action alternatives would harvest in portions of potential flammulated owl habitat that was lost due to fire effects that burned at moderate to high severities. Alternative 2 would harvest 110 acres, Alternative 3 (82.5 acres) and Alternative 4 (85 acres). As mentioned in alternative 1, forage habitat may become available in about 5 years as vegetation recovers from natural succession and/or the tree planting proposed in these alternatives. Potential nesting habitat would be available in areas adjacent to the units, as these areas were burned at lower severities or unburnt. As the vegetation continues to recover, potential prey would increase for the owl.

Noise and project activities may cause an owl to relocate to an area outside the affected units that it perceives as safe. All project activities would occur during daylight hours, so the nightly foraging by the owl may take it back into or along the edges of harvest units.

Tree-planting is planned to occur in all units after they have been harvested. Some ponderosa pine would be included in units that are along ridges or aspects that receive a moderate amount of sunshine. In about 80 years, these trees would be the future nesting habitat for flammulated owls.

Cumulative Effects

The boundary for cumulative effects analysis in the Johnson Bar Project Area. The project area has a record of the owl’s occurrence, and it represents a landscape that provides potential habitat for more than one territory (20-60 acres) of nesting owls. About 550 acres of potential habitat are present in the project area after the fire event: which is large enough for mating pairs to nest, raise and feed their young to the adult stage. The time frame for cumulative effects is 80-100 years: the time it takes to develop large snags and trees used for nesting habitat.

The spot from the Wash wildfire within the project area did not burn in any flammulated owl habitat. Past thinning projects did not impact potential owl habitat, as the affected trees (harvested or slashed) were not of the age or structure preferred for owl nesting habitat. Young seedlings or saplings left from these thinning activities would still provide potential foraging habitat.

Road and trail maintenance, construction, re-construction, decommissioning, culvert replacement or removal would not have affected flammulated owl habitat. Cattle grazing would likely benefit owl foraging habitat by maintaining the understory in a stage of annual growth or recovery. This would be limited to areas that cows can access: mainly along roads and areas of low topographical relief.

Fire suppression activities did reduce an immeasurable amount of potential habitat through fire line construction. Most of the fire lines were in areas where Ponderosa pine and Douglas-fir were a minor component of the forest.

Adjacent projects would remove dead or dying trees: O'Hara Hazard (30 dead trees in a campground), and the Wash Roadside Hazard Project (91 acres of dead or dying trees along a road), and the Baldy Roadside Hazard Project (25 acres). Most of these area affected, or proposed to be affected are not in flammulated owl habitat.

Other adjacent projects that would impact snags include the ongoing Iron Mountain Stewardship, and proposed Clear Creek Timber Sale, and Lowell WUI. The Iron Mountain Stewardship did not impact any owl habitat, and the Lowell WUI does not contain any flammulated owl habitat. About 240 acres of flammulated owl habitat was identified in the Clear Creek FEIS (September 2015), and at the most- about 14% would be affected by project activities. The project has snag and live tree retention guidelines, which would leave potential habitat for the owl.

Proposed fuel treatments (Clear Creek, Fenn Face, North Selway) would favor the retention of Ponderosa pine, and produce forage for the owl in about 5 years after the burns are implemented and create more snags in the 3,371 acres to be burned.

The action alternatives would affect between 10-13% of potential flammulated owl habitat. Additionally, silvicultural prescriptions in the Johnson Bar Project would retain live trees and snags in the range of 12-28 trees per acre, which may provide some nesting habitat for the owl. Upon completion of the salvage harvest, forage habitat would occur in 1-5 years and produce forage for another 10 to 15 years. Forest openings caused by insect and disease damage or future fires would augment forage opportunities for the owl. Combined effects of salvage harvest would reduce owl habitat by 14% under Alternative 2 and 11% in Alternatives 3 and 4. These percentages include the 1% reduction of habitat by State and private salvage harvests.

The only cumulative foreseeable project to show some reduction of owl habitat was the Clear Creek Project; which would harvest about 14% of potential habitat within that project's boundary.

Project activities are likely to disturb owls from noise and other human activities. Owls may be displaced to other areas outside of the affected units during the period of harvest activities. Silvicultural prescriptions would retain legacy trees and other large trees, whether they are alive, dying or dead. This would provide some structure for owls that may return to the open areas for foraging on the insects the dead wood or new vegetation that is occurring in post-fire conditions.

Alternatives 2, 3 and 4 *may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species* of the flammulated owl.

3.6.8.4 Fringed Myotis, Long-eared Myotis, and Long-legged Myotis Primary Habitat Elements

Three bat species associated with forest habitats in the analysis area are listed as sensitive species. In wildland settings, these three bats typically roost in snags, rock crevices, and caves. The fringed myotis is a species of greatest conservation need in Idaho (IDFG 2005). The long-legged myotis is more closely associated with coniferous forest habitat than either the long-eared myotis (second in association) or the fringed myotis. All three species are known to be multiple habitat bats in regard to roosts, hibernacula, and foraging habitats. Long-legged and long-eared myotis are known to forage together. Long-legged myotis and long-eared myotis are associated with old growth forest conditions in the Northern Region (Warren 1990).

All three bat species are known to utilize caves, mines, buildings, cliff faces, bridges, exfoliating tree bark, snags, and crevices in rocks as roost and hibernacula sites. There are no caves, mines, or old buildings in the analysis area that would be suitable hibernacula sites. Large trees with protective bark and large snags are the primary roosting habitat components available in the analysis area.

Habitat information suggests that the fringed myotis is more closely associated with forest conditions found on drier breaklands than mesic uplands. This bat is often found in dry habitats where open areas are interspersed with mature forest, creating a complex mosaic with ample edges and abundant snags (Keinath et al 2004). Fire suppression has reduced bat roosting habitats: replacing ponderosa pine, white pine and western larch, with species less fire tolerant, smaller size, and younger age classes that are more susceptible to insects and disease before reaching maturity (Wisdom et al. 2000). These conditions have limited suitable habitat for fringed myotis in the project area prior to the fire event.

Long-eared myotis are habitat generalists in their selection of roost structures among various landscape conditions (Arnett and Hayes 2009). Long-eared myotis roost under exfoliating tree bark, and in hollow trees, caves, mines, cliff crevices, sinkholes, and rocky outcrops on the ground. They also sometimes roost in buildings and under bridges (Western Bat Working Group 2005). Landscape snag densities influence the use of different types of roosts. The species has been found roosting in the snags and stumps of Douglas-fir, western hemlock (Barclay and Kurta 2007), western red cedar (Arnett and Hayes 2009), and pine (Vonhof and Barclay 1997). Arnett and Hayes (2009) found the frequency of snag use by long-eared myotis increased with density of snags and was nearly twice as high in landscapes with high snag densities (>2.2 snags/ac) as in those with low snag densities (<1 snag/ac).

Long-legged myotis are medium-sized bats, prefer large snags for roosting, but will also roost in live trees. Arnett and Hayes (2009) found that long-legged myotis infrequently roosted in snags or trees in stands <40 years old, and 58% of the snag roosts and 33% of the live tree roosts were located within riparian management buffers retained during harvest near small- and medium-sized perennial streams. Long-legged myotis roosted in snags in mid-seral (41-80 years) and old growth stands.

Arnett and Hayes (2009) indicated that the odds of snags and trees being used as roosts by female bats increased with increasing diameter. Large trees in the study tended to be in more open areas or extend above the canopy, thereby increasing detection and access for bats, as well as increasing exposure to solar radiation which contributes to cavity warming and more desirable roost microclimate. Also, the thermal and insulated qualities of wood and bark increase with diameter, resulting in more stable roost temperatures. Increased warmth of roosts reduces energetic demands and facilitates development and growth of fetuses and juveniles. Bats also may use large snags and trees because they are of sufficient age and size to have developed numerous cavities and more exfoliating bark area suitable for roosting.

All three bats have been detected on the Nez Perce portion of the forest and the north zone of the Clearwater forest. Records show 2 detections of long-eared myotis: one about 1 mile, another about 2 miles from the project boundary. Both detections were west of the project area.

Population Trends: Long-legged and Long-eared myotis have a global rank of G5 (secure) and an Idaho State rank of S3 (vulnerable). The Western Bat Working Group (1998) ranked long-eared myotis and long-legged myotis as moderate conservation concerns. The fringed myotis has a global rank of G4/G5 (apparently secure/widespread, abundant, and secure) and an Idaho State rank of S2 (imperiled). The present population status of fringed myotis is unknown. The Western Bat Working Group (1998) concluded that this bat may be uncommon or rare through the bulk of its western range, not merely at the periphery. The bat was one of the least common detected species during surveys in north Idaho (Romin and Bosworth 2010). This information is consistent with the pattern of limited and patchy distribution that was the basis for including the fringed myotis on Idaho's list of species of greatest conservation need (IDFG 2005).

Affected Environment

Modelled habitat was analyzed from GIS layers. The results show approximately 1,729 acres of suitable habitat was available to fringed myotis prior to the fire. About 1,180 acres were burned by the Johnson Bar Fire, with 271 acres reduced by moderate to high fire severities. This would leave about 1,458 acres of potential fringed myotis habitat in the project area.

About 3,143 acres of potential habitat for the long-eared and long-legged myotis. About 1,027 acres were burned in the fire, with 739 acres burned at moderate to high severities. The result is about 2,404 remaining acres that offer potential habitat for the two bats. No records of these bat species in the project area have been confirmed, although 2 records exist of long-eared bats west of the project area.

Direct and Indirect Effects

Some potential snag habitat (about 5 acres) for bats was removed in the State and private salvage harvests. However, the harvests created openings along forest edges, which increased bat foraging habitat. Action alternative effects to potential habitat for the fringed myotis would harvest 63 acres in Alternative 2, Alternative 3 (35 acres) and in Alternative 4 (38 acres). This would reduce habitat in the mentioned action alternatives by 4%, 2% and 2.6% respectively. Actual loss of potential habitat would be less, as some trees burned by moderate to high severities would possess patches of exfoliating bark that a bat could roost in.

For the long-eared and long-legged myotis, Alternative 2 would harvest 174 acres, Alternative 3 (136 acres) and Alternative 4 (143 acres). The action alternatives would reduce potential bat roosting habitat by 7% in Alternative 2 and 6% in Alternatives 3 and 4. Again, the amount of roosting habitat that is perceived to be lost may actually be a gain; as patches of exfoliating bark would increase on trees burned by higher severity fires. Stand prescriptions would retain all live trees and some large dead or dying trees. Units proposed for helicopter logging would retain fewer snags than other units, due to safety concerns of rotor wash knocking down snags. In the proposed units using ground based logging systems, most of the larger dead or dying trees would be retained in patches. Arnett and Hayes (2009) state, "Maintenance and recruitment of snags represents the cornerstone for conservation and management of bats in forests . . .[retain] large (>50.8 cm DBH [20 inches DBH]) snags that either protrude above the canopy, reside near a gap or stand edge, . . . Large, solitary snags can provide roosts for species, but retaining patches of snags will likely increase the probability of use of snags and trees as roosts. Retain snags in upslope habitats and across a range of slope exposures to provide roosts with varied microclimates offering choices to optimize thermal benefits depending on ambient conditions”. The stand prescriptions would be providing some habitat and recruitment snags for bats.

According to Vonhof and Barclay (1997), forest management creates openings and edges for foraging. Forest practices that may provide suitable foraging habitat and enhance roosts include vegetation management with reserve trees and snag retention, and prescribed fire to enhance herbaceous growth for insect production and to create roost sites. Waldien et al. (2000) stated that management of roosts for forest-dwelling bats should focus on maintaining large conifer snags across the landscape through space and time. The action alternatives would meet the latter suggestion.

Construction of temporary roads in all action alternatives would impact less than 30 acres. All trees would be removed for the placement of the roads. Upon conclusion of the project activities, these temporary roads would be decommissioned and planted with trees or other vegetation.

Noise and project activities would create disturbance. Disturbance to roosting bats may cause them to arouse and expend high amounts of energy which can lead to roost abandonment or death in the winter (Adams 2004). Harvesting would reduce the quality and quantity of available roost sites, but retaining large trees and snags would provide habitat once favorable conditions develop in treated areas (Chapter 2, Design Criteria). Clumps of green trees and snags may provide suitable habitat in treated areas, especially those near the edge of units.

Cumulative Effects

The boundary for cumulative effects analysis is the Johnson Bar Fire Salvage project area. Potential roosting and foraging habitat exists for all three species of myotis bats. Some habitat loss was affected by the fire, but some severely burned trees would provide potential roosting habitat in patches of exfoliating bark and forage habitat would increase as understory vegetation recovers. The density of tree canopies have been reduced in burned areas, and the recovery of flowering shrubs and plants in the understory is apparent. Snags adjacent to burned areas may provide roosting habitat for bats that would be foraging on the insects that are increasing in burned areas in response to the recovery of the understory. The time frame for effects on the myotis bats would be 2 to 15 years for forage habitat and 100+ years for a tree to offer potential habitat for bat roosting.

Past projects involving road reconstruction, decommissioning, maintenance and culvert replacements would not have impacted bat habitat. PCT and commercial thinning would not have impacted roosting habitat, but would have increased foraging habitat, due to more open areas created from thinning activities. Both thinning prescriptions would affect trees that are not at the age/ structure preferred for bat roosts. Recreational trail maintenance/use would remove some snags that may have provided roosting habitat, but the effects of this would be so small as to be immeasurable.

Fire suppression activities did reduce potential bat roosting habitat. Handline (10.5 miles) and bulldozer or exactor built lines (5.3 miles) reduced potential habitat by 14 acres. Private and state salvage projects reduced potential bat roosting habitat by 5 acres, and increased foraging habitat along the edges of harvested units.

Adjacent projects would remove dead or dying trees: O’Hara Hazard (30 dead trees in a campground), and the Wash Roadside Hazard Project (91 acres of dead or dying trees along a road), and the Baldy Roadside Hazard Project (25 acres). Total loss of potential roosting habitat in the Johnson Bar Fire Salvage project area by fire suppression, state and private salvage, and adjacent Roadside Hazard Projects would be approximately 130 acres.

Other adjacent projects that would impact snags include the ongoing Iron Mountain Stewardship, and proposed Clear Creek Timber Sale, and Lowell WUI. As these latter projects are harvesting live and some dying trees, it is unknown what the percentage of potential habitat would be lost in the proposed 9,275 acres to be treated. Additionally, silvicultural prescriptions would retain live trees and snags in the range of 12-28 trees per acre, which may provide some foraging habitat for the bats.

Proposed fuel treatments (Clear Creek, Fenn Face, North Selway) would create more snags in the 3,371 acres to be burned. Some of these may become future roosting habitat.

Alternative 2 would affect about 11% of the modelled habitat for the fringed myotis. Alternative 3 would affect about 6% and Alternative 4 would affect about 8%.

Alternative 2 would affect about 7% of the modelled habitat for the long-eared and long-legged myotis. Alternatives 3 and 4 would affect about 6%. Design measures for the harvested stands would retain all live trees and large snags that would offer potential roosting or foraging opportunities for the myotis species. Old growth and all riparian areas would not be affected. Disturbance impacts may create direct (displacement, harm or fatality) or indirect affects (movement from roost to avoid noise) to bats in the affected areas. Cumulative effects would extend to 100-120 years, as this is the period it would take to develop a new generation of large trees or snags with the bark component favorable for bats. The action *alternatives may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species* of the analyzed myotis bats.

3.6.8.5 Gray Wolf

Gray wolf populations were extirpated from the western U.S. around the 1930s. Over time, individual wolves from Canada occasionally dispersed into Idaho. The gray wolf was listed as an endangered species in 1978. In the mid-1990s, gray wolves were introduced into central Idaho. Biological recovery goals for the species were attained by 2002. In 2011 the USFWS finalized the delisting of the wolf in Idaho (IDFG and Nez Perce Tribe 2014).

The gray wolf is a Nez Perce National Forest sensitive species. Wolf habitat spans a broad range of elevations and habitat types. Key habitat components include: 1) a sufficient year-round prey base of ungulates and alternate prey; 2) suitable somewhat secluded denning and rendezvous sites; and 3) sufficient space with minimal exposure to humans (USDI 1987).

Denning/rendezvous sites, elk habitat effectiveness, and elk security areas (see Elk section) are used to assess existing conditions for wolves. Maintaining elk habitat effectiveness above minimum Forest Plan standards, providing elk security areas above minimum recommendations, and managing winter range to enhance forage productivity and quality will provide a sufficient prey base to sustain wolf populations at State objectives for the Dworshak-Elk City Wolf Management Zone (WMZ).

Population Trends: The Idaho wolf population has increased from reintroductions in the 1990s through 2009 (the first year of the state’s wolf hunting season). Since then, the numbers of individuals and packs have declined. The IDFG and Nez Perce tribe monitor wolves through a cooperative agreement signed in 2005. By the end of 2013, biologists documented 107 packs and

659 estimated wolves (IDFG and Nez Perce Tribe 2014). Twenty of the packs qualified as breeding pairs, producing a minimum of 166 pups (IDFG and Nez Perce Tribe 2014).

Affected Environment

Mostly all of the Johnson Bar Fire Salvage project is located in the Dworshak-Elk City WMZ. Documented or suspected wolf pack locations in the analysis area include the Tahoe Pack (unknown number of wolves), and Pilot Rock (5 wolves detected). Adjacent packs are the Newsome pack to the south of the project area (about 4 wolves detected), and the Coolwater Ridge pack (unknown wolves detected) to the east of the project area (IDFG and Nez Perce Tribe 2014).

Direct and Indirect Effects

All salvage harvest would occur in areas burned by the Johnson Bar fire. No harvest would occur in old growth or riparian areas. Proposed harvest units would retain all live trees, along with large dead and/or dying trees that would not pose a safety hazard to personnel involved in the proposed activities. Alternative 2 would harvest 2,348 acres, Alternative 3 would harvest 1,988 acres and Alternative 4 would harvest 1,350 acres in the project area. The alternatives would affect between 5-9% of the Project Area and between 10-18% of the burned areas.

Tree harvest and prescribed burning of slash piles would create openings that offer sunlight and nutrients to new vegetation. In 3-10 years after the salvage harvest, forage for elk would increase. The amount of forage from timber harvest would increase most in Alternative 2, and least in Alternative 4. Forage would improve as shrubs, grass and herbs grow and expand over bare soil. This would last for a period after prescribed burning to about 20 years.

In the short term (up to 20 years), hiding cover in regeneration and improvement harvest areas would decrease in each alternative. The proposed harvest in all action alternatives would create more open forest stands, but some hiding cover would be retained. Silvicultural prescriptions would retain live trees and snags in the range of 12-28 trees per acre. As vegetation recovers from planted trees and natural regeneration, cover would increase and become more distributed in the analysis area. Elk habitat effectiveness is expected to increase under all action alternatives and remain above minimum Forest Plan objectives (see Elk section). Wolves would adapt their hunting strategies to the movements and concentrations of their prey base.

Similar to other species, the project would create noise and disturbance to wolves in or near affected areas. All of these activities would be conducted during daylight hours. No wolf dens or rendezvous sites have been identified.

Since depredation measures on wolves has been occurring for the past few years, the animal may be more wary of human contact, and would avoid areas of human presence. However, in the absence of humans, wolves may hunt harvest units during the hours of darkness, as potential prey (deer, elk and so on) may be present. Timber harvests have been recognized by industry and field personnel to sometimes attract elk or deer to harvest units for the purpose of foraging on the leaves, needles or lichens from the fallen trees.

Road construction and prescribed fire are other human activities that may disturb wolves. All temporary roads used for timber operations would remain closed to public motorized access. At the end of their use, all temporary roads would be re-contoured and closed to motorized access. In time the absence of human activity may attract wolves back to these areas to hunt or travel through.

Cumulative Effects

The Johnson Bar project area was used as the analysis area for the wolf, as it serves as the territory for one wolf pack, with some potential habitat for adjacent wolf packs. Cumulative effects for the wolf is dependent on management goals and strategies by the IDFG, in concurrence with USDI FWS recovery goals for the Northern Rocky Mountain Distinct Population Segment. Habitat selection by wolves is more complicated than determining tree species, canopy coverage and road densities. The main factors relating to wolf occupation include increased forest cover, higher elk density and lower human density (Oakleaf et al. 2006). Areas affected by past disturbances of harvest or fire over 30 years ago, would possess a greater forest canopy coverage than more recent disturbances. Additionally, areas more remote from human access or disturbance appear to be more favorable to the wolf. However, the prey base must be there to complete the overall habitat suite for the wolf. On the Nez Perce Forest that prey is mainly elk.

Fire or timber harvest events from recent to 30 years ago, would be more likely to offer forage for elk and other big game. Wolves would likely focus/hunt those areas that are being utilized by elk or big game.

The cumulative effects of all trail or road construction and decommissioning projects created some disturbance to wildlife, including wolves, adjacent to and during the period of the activities. New roads impacted some wildlife by loss of habitat, while the obliteration of roads has allowed habitat to recover for some species. The last new road construction occurred in the 1990s; however, decommissioning of roads is ongoing across the Moose Creek and Lochsa Ranger Districts of the Forests.

Cow presence in the project area may create an increased persecution of wolves detected in cattle allotments; especially if evidence of cow mortality is linked to a wolf. At this time, there has been no reports of cattle loss in this area, due to wolf attacks. About 255 acres of the Tahoe-Clear Creek allotment was affected by the fire. Most of these areas were unburned or burned at low severity (0≤ 25% mortality). Vegetation would recover at a faster rate in these areas than those more severely burned. Therefore, the fire had a minimal impact on forage damage or production in the allotment.

Fire suppression, firewood gathering, and other ongoing or foreseeable projects mentioned at the beginning of this wildlife report would create disturbance (noise and presence of man and machine) to a wolf in or adjacent to the project area. Wolves may hunt these areas during hours of darkness, if big game or other prey are present.

The action alternatives may disturb or cause wolves to avoid areas of human presence. All the action alternatives would create forage opportunities for elk and big-game in the span of the next 15-20 years after project activities are completed. An increase in prey quantity and availability would attract wolves into the analysis area.

The cumulative effects for changes in wolf prey would be about 5-20 years. In this timeframe forage would be at peak availability, then decline as the tree overstory begins to shade out the understory. Increasing hiding cover would decrease a wolf’s visual detection of elk and big game in the area. Decommissioned road prisms would produce vegetation that would offer forage or cover for big game. Elk security would return to the present existing conditions; then increase as forage becomes better represented in the project area. Wolves would continue to be managed until elk numbers reach desired conditions by the state.

Wildfires would continue to create disturbance and produce forage in the next 20 years after such events. Fire suppression would reduce the amount of forage created by wildfires. The management for increasing elk numbers includes increased habitat and improvement of forage. The action alternatives would assist in the production of usable forage for elk and other big-game.

Current numbers of wolves and packs are above the desired levels of management for the viability of the population. They are distributed throughout the combined forest. All of the action alternatives *may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species* of the gray wolf.

3.6.9 Management Indicator Species (MIS)

3.6.9.1 American Marten

The American marten was identified as a Nez Perce National Forest management indicator species for mature forest at mid to high elevations. The marten has a close association with late succession, mesic-dominated forests (Koehler and Hornocker 1977, Buskirk and Powell 1994, Bull et al. 2005), especially those with uneven age structure and gaps in the canopy (Buskirk and Ruggiero1994). American marten are found at higher elevations and on mid-slopes during winter; while in summer they use riparian areas more intensively (Buskirk and Ruggiero1994).

In the Idaho Panhandle and the Clearwater/Nez Perce Forest, the tree species in mature mesic forests associated with marten habitat include Western Red Cedar, Subalpine Fir, Engelmann Spruce, Western Larch, and Lodgepole (Wasserman et al. 2010, Koehler and Hornocker 1977, Koehler 1975). Tree canopy cover has varied between 30 to 100%, depending on the location and type of study conducted by the researcher(s). Some researchers recognized marten’s need for a closed tree canopy at 30% canopy cover or greater (Koehler et al. 1975, Koehler and Hornocker 1977, Hargis et al. 1999). Other studies showed that marten prefer a minimal canopy cover of >73% (Shirk et al. 2014), ≥ 60% (Chapin et al. 1998), ≥50% (Snyder and Bissonette 1987, Bull et al. 2005), ≥45% (Webb and Boyce 2009), and > 40% (Wasserman et al. 2012).

During summer martens may hunt in open meadows bordering dense forests if hiding cover is present (Hargis et al. 1999, Buskirk and Powell 1994). Koehler (1975) found that the mammal avoids openings greater than 300 feet in size. Other studies found that marten use declined or was absent in larger openings or fragmented landscapes (Chapin et al. 1998, Hargis et al. 1999, Potvin et al. 2000, Wasserman et al. 2012, Shirk et al. 2014).

Marten use habitats similar to those used by fishers, but unlike fishers, they can hunt efficiently both in the subnivean layer (under snow) and on the surface of deep snowpacks (Aubry and Lewis 2003). A deep persistent snowpack was considered as a critical element for the marten (Wasserman et al. 2010): partly as an obstacle for many predators, and as a unique hunting habitat for marten in the subnivean layer.

Resting and denning sites are important habitat components: they provide marten protection from predators, inclement weather, and thermal stress (Bull and Heater 2000). In the central Rocky Mountains, large logs and snags (greater than 16 inches dbh), live spruce and fir trees (greater than 8 inches dbh), and rock crevices and red squirrel middens were important characteristics for marten den sites (Ruggiero et al. 1998). Pine marten prey on voles, snowshoe hares, red squirrels, ground squirrels, berries, birds, and eggs (Ruggiero et al. 1998).

Marten habitat may be more associated with complex vertical and horizontal woody structure, as opposed to forests of a particular age, species, or overstory requirement (Chapin et al. 1997). Examples of research that is moving away from past methods of habitat characterization include: Spatial scaling and multi-model inference of landscape patterns used for analyzing gene flow processes (Wasserman et al. 2010), interpreting relationships of marten occurrence across a special scales or habitat variables (Wasserman et al. 2012), and spatial/temporal variations in marten selection of resources (Shirk et al. 2014).

Population Trends: Considered as G5 (secure) global status, and S5 (secure) status in Idaho (NatureServe 2014). Total population size is unknown but probably is at least several hundred thousand (NatureServe 2014). Samson (2006) indicates 17,297 acres of suitable habitat is needed to maintain a viable population of marten in Region 1. Bush and Lundberg (2008) show over one million suitable habitat acres are on the forest. American marten are managed as furbearers that can be legally trapped in Idaho.

Affected Environment

Database records show one marten detection in 2011. The Biologist used habitat attributes from studies (Wasserman et al. 2010 & 2012, Koehler and Hornocker 1977) completed in the panhandle and northcentral part of Idaho for analyzing potential marten habitat in the Johnson Bar Fire Salvage Project Area. Use of computer modelled habitat showed 19,253 acres of potential marten habitat in the project area prior to the fire event. Moderate to high fire severities affected about 5,008 acres (26% of potential habitat) in the project area. Of the affected acres, about 934 acres were in old growth. About 14,245 acres of habitat remain; which includes about 5,562 acres of old growth.

The mixed severity fire reduced the canopy cover in most of the moderate and high intensity burn areas. Both of these areas are likely to be providing less than the canopy cover desired by the mammal. Additionally, food sources were killed or displaced during the fire which reduced the prey base after the event.

Direct and Indirect Effects

Salvage harvest in areas burned by moderate to high intensities would not affect marten, as the animal has already been displaced from the affected areas due to the wildfire and resulting loss of preferred habitat.

Proposed salvage harvest in potential marten habitat (areas that may still provide some structure or foraging habitat) finds Alternative 2 affecting about 932 acres, Alternative 3 (882 acres) and Alternative 4 (492 acres). All harvested units would be planted with tree species found in the forest and another 492 acres of planting would occur in areas outside of units for soil retention and forest recovery in more severely burned pockets.

Portions of harvest units in lightly burned areas would retain all live trees, and large snags that would not be a safety concern for logging operations. Due to safety issues, fewer snags would be retained in helicopter-logged areas versus tractor-logged areas.

No harvest would occur in old growth or riparian areas. Direct effects from proposed logging and road building operations would be noise and disturbance activities that may displace marten from the affected areas. Indirect effects may be displacement of the marten’s prey base in the affected areas. The predator would shift its hunting locations to where the prey base can be discovered.

Cumulative Effects

The cumulative effects boundary are for analyzing martin habitat is the 26,000+ acre Johnson Bar Project Area. Marten home ranges vary between 2,500-3,200 acres depending on gender (Shirk et al. 2014). The time span for evaluating habitat is 80+ years, as this is when the tree structure and amount of downed woody material would be available for marten denning or resting habitat.

The action alternatives would impact modelled marten habitat by 6.5% in Alternative 2, 6% in Alternative 3, and 3.5% in Alternative 4. Project activities would create noise and activities that may disturb an individual marten. Direct and indirect effects may displace a marten from its nest or foraging areas within or adjacent to a harvest unit.

All harvested units would be replanted with trees. Vegetation recovery in units would begin providing habitat for small mammals in 3-5 years. In approximately 40 years the tree structure would be favorable for martens. As the replanted stands mature, tree diameter sizes and canopy cover would trend towards desired conditions for the marten. Old growth in the project area is estimated to be about 11%.

The cumulative risk to marten habitat is considered low due to the retention of old growth and other mature trees, riparian areas, and live trees and snags left in harvested areas. Downed woody debris would continue to accumulate as trees age and die. Similar to Alternative 1, cumulative effects of fire suppression and time period of tree maturation to preferred marten habitat would occur. Under Alternatives 2, 3, and 4 *some impacts may occur to individuals or their habitat, but is not expected to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing* of the American marten.

3.6.9.2 Northern Goshawk

The northern goshawk was identified as a National Forest management indicator species for old growth forest. Current condition of nesting habitat is analyzed, as it is the most limiting factor for goshawks. Nesting habitat is represented by a much narrower range of vegetation structure and composition than the post-fledgling areas and forage area.

Goshawks use large landscapes, integrating a diversity of vegetation types over several spatial scales to meet their life-cycle needs (Squires and Kennedy 2006). In “The Northern Goshawk Status Review,” the USFWS found that the goshawk typically uses mature forest or larger trees for nesting habitat; however, it is considered a forest habitat generalist at larger spatial scales (USDI FWS 1998). The FWS found no evidence that the goshawk is dependent on large, unbroken tracts of “old growth” or mature forest (63 FR 35183 June 29, 1998).

The FWS concluded that there was no evidence of a declining population trend for goshawks in the western United States: there is no evidence that goshawk habitat is limiting the population, or that significant curtailment of the species’ habitat or range is occurring; the goshawk continues to be well-distributed throughout its historical range; and there are no significant areas of extirpation. (63 FR 35183 June 29, 1998).

In North America, the size of goshawk home ranges during the nesting period may vary from approximately 1,400 to 8,650 acres, depending on factors such as sex of the bird and habitat conditions, with male home ranges typically being larger than those of females (Kennedy et al. 1994). Later research by Kennedy (2003) showed a wider home range of home range size varying from 1,200 to 9,800 acres in size. Moser (2007) found that goshawk home ranges in northern Idaho are much larger than other regions (mean of 13,383 acres for females; 9.535 acres for males). Individuals may shift and expand home ranges after breeding. Home ranges are likely not defended from other goshawks, with the exceptions of the nest area and post-fledging area (PFA) (Brewer et al. 2009). Home ranges of adjacent pairs may overlap (Squires and Reynolds 1997; Squires and Kennedy 2006).

Nest areas are usually mature forest with large trees, relatively closed canopies (60-90%) and open understories (Squires and Kennedy 2006). Goshawks have been found to use the same nesting area for decades, and goshawk territories typically contain a number of alternate nests (Patla 1997). In central Idaho, goshawks nest in a variety of forest stands that are comprised of mature trees with relatively high canopy cover and open understories (Moser 2007). In northcentral Idaho, nest trees had a mean dbh of greater than 20”, with the nest area on moderate slopes and canopy cover of 75-85% (Hayward and Escano 1989). Favored habitats typically are located in forest stands having only 1 or 2 canopy levels with an open or mixed-density understory (Moser 2007). Goshawks have been found to use the same nesting area for decades, and goshawk territories typically contain a number of alternate nests (Moser 2007). Goshawks appear to range over large areas and use a variety of habitats outside of the nesting area. (Kennedy 2003).

Goshawks require habitats for prey that contain snags, downed logs, woody debris, large trees, herbaceous and shrubby understories, and a mixture of stand structural stages (Wisdom et al. 2000). Goshawks prey on a variety of medium-sized forest birds and small mammals. Prey items are taken on the ground, on vegetation, in the air, and include tree squirrels, ground squirrels, rabbits, hares, songbirds, woodpeckers, and grouse species that rely on a variety of forested and non-forested habitats (Squires and Reynolds 1997; Squires and Kennedy 2006). Foraging habitat may be as closely tied to prey availability as to particular habitat composition or structure (Beier and Drennan 1997). The raptor may also hunt along forest edges and in small openings. Large diameter snags and stumps are often used as plucking posts where goshawks consume their prey.

Population Trends: The goshawk is rated secure across its range (global rank G5) and is not listed as a state species of greatest concern. Other studies show no evidence that the northern goshawk is declining in number in the western United States (Kennedy 1997, FR (63) 124 1998, Kennedy 2003, Andersen et al 2005, Squires and Kennedy 2006). Samson (2006a) concluded no scientific evidence exists that the northern goshawk is decreasing in number in the Forest Service Northern Region. Samson (2006b) concluded that to maintain a minimum viable population of the northern goshawk across Region One, there would need to be a minimum of 30,147 acres of post-fledging habitat. Bush and Lundgren (2008) show over 275,000 acres of post-fledgling habitat on the Nez Perce Forest, many times the area needed to maintain viable populations region-wide.

Affected Environment

Query of the V-Map model showed 15,956 acres of potential goshawk nesting habitat was available in the project area prior to the fire. About 9,830 acres were burned. The BARC model displayed over 4,300 acres affected by moderate to high severity burns. That left a remnant of about 11,650 acres of potential nesting habitat.

Potential goshawk forage habitat was modelled at 20,468 acres. Nearly 11,800 acres were burned; the BARC model showed about 5,500 acres were affected by moderate to high severities. Remnant forage habitat was about 15,200 acres.

Numerous detections of goshawks have been recorded across the Nez Perce National Forest. Available databases show 4 records of detected goshawk within the project area during the 1990s. The most recent observation occurred in summer of 2103 by a field crew.

The mixed severity fire would have displaced individual goshawks that may have been in the area during the event. Hatchlings of the year had likely matured to the fledgling stage, and were able to escape the flames from the event that began in August. Nesting habitat that was burned by moderate or severe intensities would have been consumed by fire. Canopy cover would be reduced below the level preferred for nesting habitat. Though some large trees or small patches may have survived the fire intensities, many would have lost limbs and tree needles from the fire effects. Potential prey in these areas would have been burned or fled from the fire. Most animals preferred in the goshawk diet would not be returning to the areas for a few years. So in the post-fire period of 1-3 years, goshawks would probably avoid these areas of compromised nesting habitat and minimal to no presence of an available prey base.

Areas of low intensity burns or that were unaffected by the fire may still provide nesting and foraging opportunities. Areas of ≥60% canopy cover and shrub understories would continue to function as goshawk habitat.

Direct and Indirect Effects

Harvest units are located in areas burned by mixed severities. Forested areas consumed by moderate to high burns are not considered as current habitat supporting goshawks. Potential remaining or functioning nest habitat that is proposed to be harvested is about 851 acres in Alternative 2, Alternative 3 (809 acres) and Alternative 4 (465 acres). The alternatives range from 7% to 4% in reduction of nesting habitat.

As mentioned in the “Models and Surveys” section, the BARC model underestimated the amount of moderate to high severity burns. Field surveys showed that more potential habitat was lost due to fire activity, and salvage harvest in these areas would not impact goshawk nesting habitat. Therefore, some habitat would be impacted by harvest activities, but it would be less than the range calculated with the BARC model.

Potential remnant or functioning forage habitat that is proposed to be harvested is about 995 acres in Alternative 2, Alternative 3 (946 acres) and Alternative 4 (548 acres). The alternatives would range from 6.5% to 4% in reduction of forage habitat. Similar differences between field verification surveys and the BARC model would be evident.

The action alternatives would be retain all live trees and large snags (14-28 trees per acre) that would not pose a safety issue. As mentioned in other sections of this report, helicopter salvaged units would retain fewer snags in than those of ground-based harvest systems. These remaining trees would offer potential perch sites for the raptor, and some foraging habitat for forest birds.

No harvest would occur in verified old growth or areas of mature trees unaffected by the fire. All riparian areas in the analysis area would be unaffected by timber activities. All salvaged units would be re-planted with tree species native to the forest. Additionally, trees would be planted in areas outside of harvest units for soil stabilization (see Vegetation section of Chapter 3). Upon completion of project activities, natural forest succession would create forage habitat for the raptor in about 10 years, and nesting habitat in 100-150 years.

During project implementation, human activity, equipment noise and burning would create disturbances to goshawks in or near the area of operations. Completion of the project and human absence would provide the raptor new openings to hunt for prey.

Cumulative Effects

Areas of past disturbance (timber harvest or wildfire) that are 80+ years of forest, and not affected by recent fires, would provide habitat for the goshawk. About 11% of old growth is present in the project area. Recent private and State salvage harvests did not impact nesting habitat, but did affect some foraging habitat. Noise and activities that occurred in the latter harvests likely disturbed any goshawk(s) that were in or adjacent to the salvaged units. The same disturbance probably occurred for past road maintenance, decommissioning or culvert replacement projects.

More recent projects, such as the Iron Mountain and Lodge Point Stewardship, reduced some goshawk habitat. PCT and commercial thinning would not affect nesting habitat, as the trees that were removed did not possess the structure for a potential nest as that found in a mature tree.

An active nest was found within the Lowell WUI project area in 2014. The proposed unit where the nest was found was dropped from timber harvest consideration, and a timing limit on harvest activities in the area will be implemented. The foreseeable Clear Creek Project would reduce less than 300 acres (14%) of potential nesting habitat in the project area. The proposed Wash Roadside Hazard project would not occur in any nesting habitat.

The proposed burns for Fenn Face and North Selway would be unlikely to affect nesting habitat, as the fires would be managed for burning shrubs, slash and small trees. Forage habitat may be temporarily reduced, but would recover in 3-5 years as vegetation regenerates.

Forage and nesting habitat would be reduced by the action alternatives in a range of 4 to 7% in the project area. Harvest activities would improve growing conditions for grasses, forbs, and shrubs. Re-planting native tree species would provide future nesting habitat conditions for the goshawk in roughly 150 years.

Construction of new temporary roads would remove some potential nest trees. However, these roads are mostly in burned areas, where nesting habitat is unlikely.

Natural events may occur in the future as mentioned under Alternative 1. No measurable effects to goshawk populations at the local or regional scale, or alteration of current population trend, are expected from the cumulative effects of any of the action alternatives, or in combination with future activities, based on the availability of unaffected suitable habitats in the analysis area and across the Forest and region. Under Alternatives 2, 3, and 4, *some impacts may occur to individuals or their habitat, but is not expected to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing* of the northern goshawk.

3.6.9.3 Pileated Woodpecker

The pileated woodpecker is a Forest management indicator species for old growth forest and large snag habitat. Similar to the northern goshawk, the current condition of nesting habitat is considered the most limiting factor for pileated woodpeckers. The woodpecker’s nesting habitat is a more specialized range of vegetation structure and composition than the stand age and structure for foraging habitat. The nest tree is the most important variable to estimate breeding habitat use by the pileated woodpecker (Kirk and Naylor 1996, Giese and Cuthbert 2003).

Pileated woodpeckers are large, cavity-nesting birds associated with late successional stage forests, but also may use younger forests that have scattered, large, dead trees (Bull and Jackson 1995). The woodpecker appears to seek out microhabitats with a higher diversity of tree species and densities of decadent trees and snags than are available across a landscape (Savignac et al. 2000, Aubry and Raley 2002). Through their selection of large dead and damaged trees, the bird may serve as a good indicator of ecological function rather than just the age of a stand or forest (Bonar 2001).

Nest trees are typically dead, and nest cavities possess a good insulative value. Most nest trees in northeast Oregon were in ponderosa pine, but larch and grand fir were also used (Bull and Jackson 1995). The mean dbh of nest trees was 33 inches, trees averaged about 90 feet high, and the mean height of the nest cavity was about 50 feet. In Montana, pileateds nested in a variety of tree species, including larch, ponderosa pine, grand fir, and Douglas-fir (McClelland and McClelland 1999). The authors also noted that nest trees were a minimum of 20 inches dbh and over 90 feet high, and stands typically had greater than 50% canopy closure.

Pileated woodpeckers roost in hollow trees or vacated nest cavities at night and during inclement weather. Roost trees are similar to nest trees but typically have more entrances. In northeast Oregon, pileateds roosted in unlogged stands of old growth grand fir with canopies >60%. Roost cavities were in live or dead grand fir, larch, or ponderosa pine trees, and 95% had a hollow interior created by decay rather than excavation (Bull and Jackson 1995). Bull and Jackson (1995) suggest that by excavating only the entrance hole to gain access to the hollow interior of a tree, pileateds conserve energy by not having to excavate the entire cavity. In Montana, pileateds roost in western larch, black cottonwood, and ponderosa pine (McClelland and McClelland 1999).

Feeding habitat for pileateds is highly dependent on the availability of carpenter ants which make up the majority of their food supply (McClelland and McClelland 1999). Cover types selected by the woodpecker include mixed conifer, ponderosa pine/Douglas-fir, western larch, grand fir, and decadent lodgepole pine stands. Preferred feeding habitats have high densities of snags and logs, dense canopies, and tall ground cover, with more than 10% of the ground area covered by logs. Pileateds seem to forage on large, decayed trees, and preferentially forage at low heights on tree boles; down material may need to be in excess of eight inches diameter and stumps between four to six feet high before pileateds will use these structures for foraging (Aney and McClelland 1990, Flemming et al. 1999).

Territories of nesting pairs cover 500-1000 acres in Montana, 1000-1300 acres in western Oregon, and 320-600 acres in northeastern Oregon (Aney and McClelland 1985). Not every stand within a bird's home range is used as feeding habitat. The range of a nesting pair is partly determined by the amount of suitable feeding habitat in proximity to the nest site.

Pileated woodpecker cavities are an important resource for a variety of cavity-using wildlife, especially those animals or birds that are too large to utilize cavities created by smaller woodpeckers (McClelland and McClelland 1999, Bonar 2001). In addition, pileateds provide foraging opportunities for other species and accelerate decay processes and nutrient cycling (Aubry and Raley 2002).

Bull and Meslow (1977) concluded that to maintain a pileated woodpecker population in northeast Oregon, 0.14 snags per acre 20 inches dbh or greater were needed. Bull and Holthausen (1993) later recommend maintaining a minimum of 0.65 snags per acre greater than

20 inches dbh. Retention of large, seral tree species is an important component for maintaining habitat for this species in managed forests.

Population Trends: The pileated woodpecker is rated secure across its range (global rank G5) and apparently secure (state rank S4) in the state of Idaho (ICWCS 2015). Samson (2006) concluded that no scientific evidence exists that the pileated woodpecker is decreasing in numbers in the Northern Region. He indicates 90,441 acres are required to maintain a viable pileated woodpecker population in the Forest Service Northern Region. Bush and Lundberg (2008) show 299,667 acres of nesting habitat and 444,789 acres of foraging habitat on Nez Perce National Forest. Based on Bush and Lundberg's (2008) estimate, the Nez Perce Forest contains about three times more nesting habitat than is needed to provide viability at the Regional level.

Affected Environment

The forest GIS model for pileated woodpecker habitat shows approximately 2,177 acres of nesting habitat. About 513 acres burned at moderate to high severities, and lost the preferred canopy cover the woodpecker prefers. Remnant nesting habitat is currently estimated at 1,664 acres.

About 20,400 acres of foraging habitat was located in the project area prior to the fire. The wildfire and a spot from the Wash fire burned about 460 acres at high severities. Such intense fires can cook the cambium to a point where there would be no food for beetles, and thus reduced forage for woodpeckers.

Similar to the discussion on the northern goshawk, the mixed severity fire has reduced pileated habitats in some nesting areas. Areas of moderate to high severity burns would suffer a high tree mortality rate; which would include large trees. However, mosaics of live trees may survive in these affected areas. They would usually consist of large to mature trees, and species such as western larch, ponderosa pine and even some Douglas-fir. Approximately 5,500 acres of old growth was calculated in the project area. About 2% of this was burned at moderate to high severity. The remaining old growth offers potential nesting and foraging habitat for the pileated woodpecker. Large or mature trees 20 inches or greater dbh in unaffected or areas of low intensity burns would likely continue to function as potential nesting habitat for the woodpecker.

The fire event has produced a large quantity of snags of various bole diameters. Those that are larger than 10" dbh would provide potential foraging habitat for the pileated woodpecker. Other species of woodpeckers will move in the season after the fire (2015) to begin feeding on the beetles and other insects that are attacking the dead and dying trees. These birds include the black-backed woodpecker, three-toed woodpecker, northern flicker and downy and hairy woodpecker. The pileated woodpecker will forage on beetles (Bull and Jackson 1995). However, the bird's preference food is the carpenter ant. These and other ants will become more common in the break-down of decaying wood, from 3 to 10 years after the post-fire event. Snag densities and the availability of food sources would likely be very favorable for the pileated woodpecker during the next 15 years in the project area.

Direct and Indirect Effects

All action alternatives would propose harvest units in mixed severity areas. Nesting habitat is considered to have some lost large snags in high severity burned areas. Harvest in such areas would affect 80 acres in Alternative 2, Alternative 3 would impact (76 acres) and Alternative 4 (15 acres). Silvicultural prescriptions would retain all live trees, and large snags that would not create a safety concern for the logging system that is used. Helicopter units would have less snag retention than other units.

Foraging habitat would be reduced by 1,982 acres in Alternative 2, Alternative 3 (1,766 acres) and Alternative 4 (1,196 acres). The same prescriptions would apply as those mentioned in the previous paragraph. New temporary road systems would remove up to another 35 acres of trees to construct the prisms.

Most of the retained snags or dying trees would possess diameters (>15” DBH) and saved in patches if possible, or as solitary trees/snags. Though canopy cover will be less than the (>60%) habitat used by pileated woodpeckers for nesting, foraging habitat would be available from the amount of woody debris left after the harvest.

Prescribed burning would occur in units, which would target small sized fuels and large piles of slash. Vegetation treatments in all action alternatives would reduce habitat quality by decreasing canopy cover, and reducing standing snags in treated areas according to the safety practices associated with the logging system designated for each unit.

No harvest would occur in areas of verified old growth, live mature trees or riparian areas. All salvaged units would be re-planted with tree species native to the forest. Upon completion of project activities, natural forest succession would create nesting habitat for the woodpecker in about 100-150 years.

Action alternatives would cause short-term displacement of individual pileated woodpeckers in treated areas. During project implementation, human activity, equipment noise and prescribed burning would preclude or discourage use in and near treated areas. Completion of the project and human absence would encourage the woodpecker to return to burned areas for food and nesting opportunities. Disturbance of individuals during project implementation is unlikely to cause measurable injury or decrease productivity, by substantially interfering with normal breeding, feeding, or nesting behavior on a forest-wide basis.

Cumulative Effects

The effects to the woodpecker from past, ongoing and foreseeable projects or disturbances would be similar to what was mentioned for the northern goshawk. The Lowell WUI project would reduce potential pileated woodpecker habitat. The Clear Creek Project proposes to reduce habitat in that project area by 5 or 6%, depending on the alternative to be selected. The Wash Roadside Hazard project would reduce 91 acres of potential foraging habitat. The proposed burns on Fenn Face and North Selway would create new foraging habitat from trees that are killed or damaged by the fires.

The cumulative effect area is the approximate 27,000-acre Johnson Bar Fire Salvage project area which includes six old growth analysis areas. This area is large enough (home range is about 1,000 acres) and contains habitat that could sustain more than one pair of woodpeckers and their offspring. The fire burned in some old growth, but over 5,500 acres (11%) remain in the area.

The cumulative effects timeframe is 100-150 years, as it would take this long for regeneration harvest areas to develop into large tree or old growth habitat. Timber harvest may contribute to short-term habitat fragmentation until harvested stands reach later stages of succession. Problems associated with forest fragmentation include weather-related effects and loss of forest interior habitat, loss of habitat connectivity, and increased vulnerability to predators (Finch 1991). The action alternatives would not disrupt habitat connectivity for pileated woodpeckers. Riparian areas would not be affected and old growth would be maintained. Both areas would provide nesting and foraging habitat.

Some disturbance to woodpeckers would occur during the implementation of any of the action alternatives. Depending on the Alternative selected, between 1-5% of nesting habitat would be removed and 6-10% of foraging habitat would be reduced. Under Alternatives 2, 3, and 4, *some impacts may occur to individuals or their habitat, but is not expected to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing* of the pileated woodpecker.

3.6.9.4 Rocky Mountain Elk

Elk is a MIS for commonly hunted big game species on the Nez Perce National Forest, and an indicator for general forest seral species easily affected by management activities. Elk are habitat generalists and use a diversity of forest types and structures that provide forage and hiding cover. They use meadows and early seral communities for foraging in spring through early summer. From late summer through fall, elk forage more frequently under the forest canopy. During winter, they rely upon low elevation, warm aspect, and snow free or snow limited areas for foraging. Adult bulls often winter at much higher elevations than cows and immature elk. Elk also require forest cover for security and thermal regulation (Thomas et al. 1979). Calving areas can be traditional and preferred sites are generally large meadows, shrub fields and early seral forest openings in close proximity to water. A mosaic of diverse forest, shrub field, and meadow conditions with available water, productive winter range, and adequate security characterizes good elk habitat.

Population Trends: Elk populations in the analysis area were relatively insignificant until major fire events occurred in the early 1900s that increased forage availability and population levels. Populations in the north and central areas of Idaho probably peaked in the 1960s (IDFG 2014). Since the 1990s, elk populations in north and central Idaho have declined in forested areas due to weather events, predation by bears and lions, and more recently from wolf expansion. Active predator management is currently pursued by IDFG, and the statewide population as of 2013 is estimated at approximately 107,000 animals.

Affected Environment

The analysis area falls in the Idaho Department of Fish and Game's Big Game Management Unit 16 of the Elk City Management Zone (EMZ). The most recent (2008) elk population survey in MU 16 showed that the total elk numbers are up from a previous survey in 2006. Cow elk numbers were higher in 2008 and met the State's population objective (Table 32).

Table 32. Elk winter population status and objectives for MU16 based on the most recent survey (IDFG 2011)

Management Unit	Survey Year	Status				Population Objectives	
		Cows	Bulls	Calves	Total	Cows	Bulls
16	2008	4,264	863	875	6,002	3,150-4,650	675-1,000
16	2006	3,334	686	904	4,924		

State ratios of bull and calf to cows were analyzed (IDFG 2014). Bull to Cow ratios were 21/100 in 2006; while 2008's ratio was 20/100. The recruitment average of 27 calves/100 cows occurred during 2006. For 2008, the average declined to 21 calves per 100 cows. The calf/cow ratio is an important indicator of population recruitment and long-term herd viability. A ratio of at least 25 calves to 100 cows is needed to offset natural mortality. Reasons for the decline in ratios are unclear but may be related to reductions in forage quality (poor condition of cows and low calf weights), high predation rates, less security area, and greater human disturbance and/or hunting pressure.

Elk Winter Range

Existing Condition

Winter range is primarily below 4,500 feet in elevation on southerly aspects and includes grasslands, brushfields, and timbered lands. Generally, winter range receives less snow and is located at lower elevations than summer range. During winter, cow elk seem to prefer shrub habitats, while bull elk favor more open timber types (Unsworth et al. 1998). Older bulls also tend to use higher elevation benches or ridges with heavier snowfall compared to habitat used by younger bulls and cows (Unsworth et al. 1998).

Quality forage is an important component of elk winter range. Elk forage on grasses, forbs, and the tips of twigs from some woody vegetation. Shrub fields and conifer forests provide a higher proportion of winter forage than grassland sites. Species such as redstem ceanothus, serviceberry, mountain maple, choke and bitter cherry, and syringa provide much of the winter forage available to elk.

The Nez Perce Forest Plan (1987) designates Management Area 16 as big game winter range, though other MAs provide elk habitat considerations as an ancillary management intent for consideration. MA 16 and MA 14 are the management areas that provide about 9,937 acres for elk winter range in the project area. The goal for MA 16 is “manage to increase usable forage for elk and deer on potential winter range.” A portion of MA 14’s intent is to improve the quality of winter range habitat for deer and elk. Other MAs would offer general elk habitat, such as riparian areas.

The elk summer and general range is spread out among 3 Elk Analysis Areas (EAA) in the project area. However, only 2 of these EAAs are affected by cattle allotments and road use changes. These two EAAs will be analyzed for project affects to elk. Both elk units are about 11 square miles in area. Roads open year-round either intersect or are adjacent to all blocks of winter range. Security around these areas of winter range appears low; however, the roads are not plowed during the winter months.

Direct and Indirect Effects

Of 9,937 acres of MA 16 winter range, Alternative 2 would harvest 1,496 acres, Alternative 3 (1,311 acres) and Alternative 4 (805 ac). All of the proposed acres to be harvested are also in areas burned by the fire.

As mentioned throughout this section, regen harvest prescriptions would retain all live trees. Large dead or dying snags in patches or solitary status would be retained in areas where they would not be safety concerns to timber activities in the affected units. The result would be rather open areas, with patches of trees that would offer some hiding cover. No harvest would occur in old growth or riparian areas.

The action alternatives would create disturbance (noise and human activities) to individual elk. Elk may return to salvage units during hours of darkness to forage on lichens or foliage from downed trees. Harvest operations may occur during the winter season, if soil and snow conditions are favorable. However, over 3,900 acres of winter range that was unaffected by the fire would remain available for elk in the project area.

Prescribed burning would reduce slash and prepare the units for tree planting. The burns would occur in jackpots of slash. Implementation of any of the action alternatives would increase forage production on winter range by stimulating shrub production. The proposed treatments would remove dead or dying trees and allow sunlight, water and nutrients to become more available to shrubs, forbs, grasses and newly planted trees. Forage quantity would increase in harvested areas for 20-30 years or until tree canopy cover closes and forage plants begin declining.

Temporary roads would be closed to public motorized access. Upon completion of each sale, these roads would be decommissioned. Past disturbances in the Project area have created a mosaic of vegetation age and structure. The Johnson Bar Fire had re-burned over past fires and timber units. These recently affected areas will be providing increased forage to elk and other big game on the winter range for up to 20 years: until the shrubs are too high for elk to reach in the winter.

Elk Summer Range

Existing Condition

Summer range may overlap with wintering areas, as animals tend to move to higher elevations as the snow melts and additional forage becomes available. Important habitat components on spring, summer, and fall range include foraging sites, hiding cover, calving areas, rutting and security areas. In the unburned areas within the project boundary, the availability and abundance of understory forage in most of the mature or old growth stands are declining. Some shrub species have attained small tree status and are mostly unavailable for forage. Tree canopy cover is increasing, causing a decrease in available forb, grass, and shrub forage. Hiding cover is available in forest stands mid-seral or older.

Newly burned areas and those proposed for salvage harvest would begin to provide forage in 2-5 years, depending on the burn severity. As stands grow from seedling to sapling stage, patches of hiding cover would develop. All MAs that are able to support tree stands would provide big-game summer range within a few years post-fire.

“Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho” considers road density, livestock grazing, and cover-forage ratios and was used to evaluate summer elk range (Leege 1984). This report is found in Appendix B of the 1987 Forest Plan. An updated reference on elk summer habitat management (Servheen et al. 1997) has generated interest from some of the public as to replace the Leege (1984) guidelines. Servheen et al. (1997) suggest analyzing for motorized trails, which were not considered at the time the forest adopted the 1984 guidelines. However, Forest Plan Amendment Number 23 (1997), corrected the road’s analysis to include motorized trails. Thereby, a motorized trail is now analyzed under the primitive road section of the worksheet, which results in the same value of standard road miles by either guideline. Livestock presence in an elk analysis area is similarly calculated, as well as security areas, cover and forage.

The Elk Vulnerability model is unique to the Servheen et al. analysis. The model attempts to analyze elk depredation from hunting, natural mortality factors, road impacts (access for hunters), and extrapolate this information to trends in elk mortality per Game Management Unit (GMU).

Liabilities of the model for use with Forest Service projects include the scale of analysis and mortality factors. The desired scale for analysis is at the Game Management Unit (GMU). These units range in size from 262 mi² to 1,555 mi²; while the Johnson Bar Project area is 42 mi². For impacts on elk in the project area, the biologist analyzes smaller polygons called Elk Analysis Areas or EAAs. These units are calculated from the input proposed in guidelines from Leege (1984), which is also used in Servheen et al. (1997). Each EAA in the project area ranges from 7 to 14 mi². Extrapolating road densities from Forest service lands, such as the Johnson Bar Project, to a GMU would be conjecture, and not a dependable source for determining elk vulnerability at the larger scale. Road densities and hunter activities vary on private and corporate lands, in comparison to Forest Service lands. The larger size of the GMUs in Central Idaho include wilderness, roadless areas and other terrain inaccessible to motorized vehicles, as well as the areas previously stated.

Mortality factors in the Vulnerability Model depend on consistencies. Changes in hunting seasons or alteration of female or male elk numbers allowed for hunting would skew trends the Servheen document discusses. The elk vulnerability model only gathers data on legal hunting. Illegal take is not factored. Treaty rights for the Nez Perce tribe allows take of big game throughout the year, of either sex, with any weapon. The model does not address this supplemental mortality. Additionally, the IDFG has recently increased trapping and other controls on the wolf population; which was not a consideration in the Servheen et al. 1997 guidelines. The latter document discusses a 10% natural mortality for elk, but the state's increased predator control must be the result of a known or perceived natural threat that is creating a larger mortality of elk than originally thought.

The IDFG has not contacted the forest about the need or implementation of this model. The public arguing for the change of elk modeling guidelines are requesting the agency replace a 30-year old plan with one that is nearly 20 years old. Both need to be replaced with an analysis that uses the best available science, and more up to date knowledge. As the Forest progresses in its forest plan revision, the best available science will be selected and used for elk analysis. The Forest Service manages habitat for wildlife, while the IDFG manages the state populations for animals that are legally hunted or trapped. It would make more sense for the IDFG to generate and interpret this model, as they gather annual hunter harvest information to determine the management (tags, timing of season, etc.) for elk in each Big Game Unit.

Summer range habitat effectiveness objectives were established in the Nez Perce Forest Plan for elk analysis areas (EAA). There are 3 EAAs in the Lolo analysis area. One of these areas has a very small area (approximately 230 acres) affected by the fire. Portions of one unit are proposed to harvest about 24 acres of this burned area. No new roads are planned for accessing this unit. The effects of the proposed actions would be immeasurable to this EAA, and it was dropped from analysis. The other two EAAs are analyzed in Table 33. The Forest Plan objective for summer range elk habitat effectiveness (EHE) is to achieve a minimum of 50% effectiveness in the Lodge Point (7021) unit and 75% effectiveness in the Goodard (7141) unit. Currently, the Lodge Point unit meets its objective, while the Goodard is below the objective of 75% as noted in Table 33. The latter unit has low road densities, plenty or cover and security areas, but contained less than 5 acres of open forage habitat prior to the Johnson Bar fire.

Table 33. Elk summer range habitat effectiveness by alternative in the LID analysis area.

Elk Analysis Area (EAA)	EAA Acres	Forest Plan Objective (%)	Summer Habitat Effectiveness (%)			
			Alt 1 Existing	Post Alt 2	Post Alt 3	Post Alt 4
302017141	7102	75	71	71	71	71
304067021	6890	50	54	54	54	54

Direct and Indirect Effects

All action alternatives would increase forage in the Goodard EAA by 3%. Forage would increase by 4-5% in the Lodge Point EAA, depending on the selected alternative. Direct effects to elk habitat effectiveness would be from shifts in the distribution of cover and forage, roadwork and increased traffic. During the implementation of Alternatives, EHE in the Lodge Point would decrease to 54% under all proposed alternatives. The temporary decrease in elk habitat effectiveness is due to the construction of temporary roads, traffic on haul roads that were previously closed to motorized traffic, and disturbance from man and machine. Under all action alternatives, the temporary effects to elk habitat is that road density increases and security areas become smaller. Upon completion of the project (regardless of the selected alternative), EHE levels would return to the existing condition found in each EAA (Table 33). The EHE in the Goodard EAA would remain at 71% for all action alternatives due to the minor amount of harvest (about 200 acres).

Hiding and thermal cover have been reduced by the wildfire event. Hiding cover is defined as the vegetation capable of hiding 90% of a standing adult elk from a viewing distance of 200 feet or less (Thomas et al. 1979). So, hiding cover strongly influences the detection of elk, especially for humans. Thermal cover is habitat that elk may seek out as means of thermo-regulation: using vegetation to reduce wind effects, or a vegetative cover to keep in heat and/or act as an intercept for snow or rain. Thermal cover is a stand of conifers at least 40 feet tall, and the average canopy closure greater than 70% (Thomas et al. 1979). Proposed salvage harvest would create larger openings, and further reduce some hiding cover. Any harvest in areas that once offered thermal cover would have no effect, as the thermal cover would have already been lost to the effects of the fire.

Timber harvest reduces tree canopy coverage, but allows sunlight, water and nutrients to be more available to shrubs, forbs and grasses. Forage quantity would increase in harvested and burned areas for about 20-25 years. Forage representation would decline after this as the tree canopy cover increases. Burning releases nutrients that plants can use for a short-term benefit (1-2 years). Higher quality forage better prepares elk condition for winter. An increase in the quantity and quality of forage should help improve calf survival, as well.

Elk Security

Existing Condition

Security areas are places where wildlife can retreat for safety when affected by disturbance. In general security areas are over 250 acres in size and greater than ½ mile from an open road or trail. The 1984 guidelines recommend at least 20% on an EAA as security areas; and a minimum of 60% cover (Leege 1984). Total percent of Security areas for the EAAs by alternative are displayed in Table 34.

Table 34. Security areas in Johnson Bar Fire Salvage analysis areas.

Elk Analysis Area (EAA) Name	EAA Acres	Security %			
		Alt 1	Alt 2	Alt 3	Alt 4
(1.) Goodard	7,102	28	24	24	24
(2.) Lodge Point	6,890	15	14	14	14

Direct and Indirect Effects

During implementation, regardless of which action alternative is selected, the alternative would reduce the percentage of security areas due to the use of existing or temporary roads to access the salvageable timber. Some temporary roads would be built, and some closed roads would be re-constructed to access proposed units. All action alternatives would drop security areas by 4% in EAA (1.) and 1% in EAA (2.). Elk would move to other security areas outside of these EAAs during periods of disturbance from man and machine. Upon completion of the timber sales, these roads would be decommissioned and closed to public motorized access. Security Areas would increase over time as forage becomes available to elk.

Timber harvest and prescribed burning would reduce cover in proposed units. Again disturbance would occur to individual elk in or near to affected areas. Both activities would increase forage across the analysis area for elk and other big game in 2-10 years post-harvest operations, depending on the burn intensity the areas were affected by.

Cumulative Effects

Ongoing or foreseeable timber or burning projects would disturb elk in or near the proposed units by the activities or presence of man in these areas. In most cases the activities would reduce hiding cover and create future forage habitat for elk.

Some projects that would not affect elk habitat, but would still create disturbance from man or machine during the time of activities. These projects would include road or trail maintenance, culvert replacement, and road decommissioning.

Woodcutting along roads open to public motorized access would continue, which may disturb elk in the area.

Temporary roads would be built in these alternatives and would remain closed to public access. The project activities would disturb elk during the period of implementation. Elk would move away from these areas, but may return during hours of darkness to forage on the lichens or younger leaves on the felled trees. Upon completion of the timber sales, all temporary roads would be decommissioned. Security areas would increase in response to the road closures in the EAAs.

All action alternatives would improve about 8-15% of existing winter range. Another 3-5% of summer and general elk habitat outside of winter range would be improved from harvest activities. All treated units would improve at a faster rate than areas unaffected by timber activities, as all units would be planted with tree species found on the forest. In 5-10 years tree stands would be evident in the treated areas, whereas, the untreated areas may just be producing an understory of grass, herbs and shrubs. The planted areas would provide hiding cover in about 15 years post-harvest. About this time a mosaic of openings and developing forest conditions would provide an increase in EHE levels and the acreage available as security areas.

3.6.9.5 Shiras Moose

In Idaho, moose occur mainly in mountainous conifer forests. Moose select vegetation types where forage is abundant in all seasons. Winter range is characterized by double-canopied, coniferous forests which intercept significant amounts of snow and also provide palatable evergreen forage. Forest vegetation types used by moose include grand fir and subalpine fir, especially those areas that have a subcanopy of Pacific yew (Pierce and Peek 1984).

Moose in north-central Idaho select dense Pacific yew stands in old-growth grand fir communities during winter (Pierce and Peek 1984). Fire suppression likely increased frequency and extent of Pacific yew, but timber harvests within the same areas has reduced the extent of yew communities. Pacific yew was typically slashed and burned during the course of regeneration timber harvest practices prior to 1987 (Crawford 1983 and Stickney 1980). From 1987 to 1991, timber harvest and burning were constrained in areas allocated to moose winter range. After development of the Conservation Guidelines for Pacific yew (USDA 1992), timber harvest and burning in Pacific yew stands have been reduced considerably. Forest fragmentation from harvest has reduced patch size and interior conditions, and isolated Pacific yew stands.

Moose disperse to higher elevations during summer, where open-canopied habitats provide abundant forage. Favored summer foraging areas include lakes, creeks, meadows, 5-40 year old timber harvest units, and burned forests (Innes 2010). Even-aged pole timber stands are also used (Pierce and Peek 1984). Both riparian and upland shrub species are consumed, and favored browse species used year-round include: willow, menziesia, mountain maple, serviceberry, and Pacific yew.

Pierce (1984) conducted a moose habitat use and selection study on the Red River Ranger District from 1979-1982. Mature stands were used throughout the year, old growth was used more than expected during all seasons except summer, and stands containing Douglas-fir and lodgepole pine were avoided. Moose used all timber cover types in proportion to their availability from June to August.

The Nez Perce Forest Plan designated MA21 as grand fir/Pacific yew communities to be managed for moose winter range. The goal in MA21 is to manage the grand fir-Pacific yew plant communities to provide for a continuing presence of Pacific yew "suitable" for moose winter habitat. Management standards and practices for timber harvest and fire management in MA21 to help maintain suitable winter habitat are found in the Nez Perce National Forest Plan (1987; III-59).

Population Trends: Moose are considered a big-game animal in the state of Idaho, with annual drawings rewarding a limited number of hunters.

Affected Environment

The project area encompasses about 768 acres of MA 21 winter range for moose. This area of winter range consists of 9 patches ranging in size from 8 to 387 acres. Half of the MA 21 patches are greater than 50 acres in size, while the other half is less than 40 acres in size. A total of 32 acres of MA 21 moose winter range was burned in the fire. Areas that were unburnt or of low severity fire affected about 22 acres of MA 21, and 10 acres of moderate severity burned about 10 acres. Areas affected by low severity fire would still retain hiding cover and forage. Moderate severity burns would have burned most of the understory vegetation and some trees would have been killed. Hiding cover would likely be present in these areas, however, forage most likely would have been reduced by the wildfire. The spot fires from the Wash Fire did not affect moose winter range. The fire event would have pushed individual moose out of burning areas and relocated these animals to unaffected areas. No detections of moose in the project area were in the wildlife observation databases.

Direct and Indirect Effects

All three alternatives propose harvest in 14 acres of MA 21 moose winter range. These acres have been burned over by the Johnson Bar Fire. Noise and project activities would create possible disturbance to individual moose that may be in the affected areas. This may cause moose to avoid the area until the activities are completed. However, moose may return to harvest units during hours of darkness to feed on the foliage from trees that have been dropped to the ground by logging operations.

Approximately 5 years after the burn or harvest operations, shrubs would be recovering in the harvested areas and other areas of the low intensity burns. About 10 years post-fire, shrubs and other vegetation would be available with improved quantity and quality for moose and other ungulates.

Cumulative Effects

Wildfire events in the area would have caused temporary loss of moose habitat in areas that burned in moderate to high severities. All fires would have created forage for moose in a period of 3 to 20 years after the respective fire. The return of hiding cover would take about 15-20 years after the fire; as trees grow to the height and density to offer shelter for moose movement among the recovering forest.

The effects on moose from past timber harvests would be similar to the wildfire events as mentioned. Additionally, during the time of such harvests, the activities and presence of man would have disturbed moose in or adjacent to the affected units.

Trail or road maintenance, culvert replacement, or road decommissioning would not have reduced moose habitat. However, those activities would have created potential disturbance to a moose in the area during daylight hours. Construction of new roads would reduce potential forage and some hiding cover for the animal.

About one-third of a mile on a Forest Service road is open year-round to motorized access. This segment lies on the edge of moose winter range. None of the snowmobile trails, as mentioned in the elk section, lie in MA-21.

Ongoing timber sales would reduce some moose habitat by about 1,000 acres in areas adjacent to the Johnson Bar project area. Foreseeable projects include the Clear Creek Integrated Restoration, Lowell WUI, and the Wash Roadside Hazard. The latter would not affect moose habitat as the hazard tree removal would consist of dead or dying trees adjacent to roads. The Lowell WUI project does not occur in MA 21, but would remove potential hiding cover for moose that wander through the area. Forage is lacking in this project boundary, and the proposed timber removal would benefit the recovery of shrubs. The Clear Creek project would reduce MA-21 by less than 4% in that project area.

Proposed burn projects would stimulate shrub and grass components on the Fenn Face and North Selway areas. Both planned burns would not occur in designated moose winter range.

All of the action alternatives would affect about 2% of moose winter range (MA 21) in the project area. The direct effects of disturbance have been discussed. Indirect effects may be increase pressure on moose from wolves and other predators, due to the reduction of canopy and hiding cover from fire and salvage harvest.

None of these alternatives would harvest old growth or in riparian areas. All harvested units would be re-planted with native species to the forest. Tree planting would also occur in areas outside of salvage units (see Vegetation Report). Besides the planted trees, natural vegetation response to the areas affected by harvest and fire would be similar to what was described in Alternative 1. The same applies to the disturbance factors mentioned in Alternative 1. Under Alternatives 2, 3, and 4, *some impacts may occur to individuals or their habitat, but is not expected to result in a loss of viability in the planning area, nor cause a trend toward federal listing* of the Shiras moose.

3.6.9.6 Neotropical Migratory Birds

Neotropical Migratory Bird Laws - Under the National Forest Management Act (NFMA), the Forest Service is directed to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives" (P.L. 94-588, Sec 6 (g) (3) (B)). The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by the US Shorebird Conservation Plan and Executive Order 13186 in 2001, and the January 2004 PIF North American Landbird Conservation Plan all reference goals and objectives for integrating bird conservation into forest management and planning.

In late 2008, a Memorandum of Understanding between the USDA Forest Service and the US Fish and Wildlife Service to Promote the Conservation of Migratory Birds was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the Forest Service and the Fish and Wildlife Service as well as other federal, state, tribal and local governments. Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities.

Neotropical migratory birds are species that breed and rear their young in the United States and Canada, then migrate south to winter in Mexico, the Caribbean Islands, and Central and South America. The status of neotropical birds is of special concern to state and federal agencies and conservation groups. Many of these birds are experiencing serious declines in population. Some migratory birds are covered by the endangered species act, while others are managed by state hunting regulations. Most of the migratory birds on the forest are protected as non-game status by the Idaho Department of Fish and Game.

Design criteria for project activities cover potential disturbances to birds, and allow for mitigations of the project if necessary. Timber harvest techniques and prescribed burning would benefit many species of neotropical migrants that depend on shrubs and seral tree species for nesting and foraging.

Affected Environment

The project area contains portions of 6 OGAAs, with an approximate total of 5,500 acres of remaining old growth (after the fire event), and over 4,600 acres of riparian areas. Approximately one half of the project area was burned by the Johnson Bar Fire in 2014, including riparian areas, and 950 acres of old growth.

Fire intensities ranged from low to high with the respective tree mortality rates from 10-100%. Tree canopies were reduced, existing snags probably burned to the ground, and large portion of the existing downed woody debris was consumed.

The post-fire landscape would possess a large number of snags or dying trees that may still have pine needles on the branches. Areas that were affected by moderate to high fire severity would lack an understory, while the overstory would consist of larger diameter trees: many dead or dying, with some surviving the event. Low severity areas may retain most of the tree structure and patches of understory.

Generally, the canopy cover has been reduced throughout the burned areas. Hutto (1995) found 87 avian species in burned areas from 33 fires in Montana. Point counts were conducted in these areas during first or second year after the fire events. 77% were considered as migrants that winter to the south (Hutto 1995). The author does not elaborate if these birds are neotropical migrants, and most of these species have been seen in unburned forests as well. The species found in fire-affected areas represent most bird families with the exception of waterfowl and shorebirds. In general the mixed severity fire created a recovering forest with reduced canopy, large numbers of dead and dying trees and more numerous open areas.

Direct and Indirect Effects

All action alternatives would harvest dead or dying trees in burnt areas. The alternatives would impact from 8.5-11% pf the project area. No harvest would occur in old growth or riparian areas. Noise and movement of machinery and other human activity may disturb migrant birds. The operating season, year-round for up to 3 years, may disrupt some nesting birds in or near areas of project activities. However, operations would be suspended when soil conditions become unfavorable or other weather conditions occur (fog in helicopter flight paths and so on).

All live trees, and some large burnt trees/snags and patches of snags would be retained in harvest units. This would leave some structure in units, as well as food sources for insects and birds. Individual bird pairs may lose their nests in areas proposed for salvage harvest. However, approximately 90% of the project area would not be affected by timber operations, and would continue to provide forage and nesting habitat for birds in the area.

Cumulative Effects

The boundary for analyzing the cumulative effects for neotropical birds would be the Nez Perce Forest Boundary. It is large enough to provide habitat for many migrant birds that prefer the following habitats which include: snags, downed woody material, shaded and open riparian areas, multi-stage forests, alpine and lowland habitats, old growth and burned areas.

Past, ongoing and foreseeable wildfire and timber harvest impacts to wildlife are described in the Environment Consequences section of this wildlife report. All projects likely disturbed any neotropical migrants that were in or near the fire or project area. In some cases, harm or fatality may have occurred to some birds. In other cases, the disturbances may have created habitat for bird species that prefer more open areas or forest edge habitats. As vegetation recovers from the natural or man-made disturbances, new habitat would become available for migrant species. As forest succession progresses, different guilds of birds would find new habitat, or lose habitat as the tree structure matures.

Harvested units would recover from native seed sources in the soil and planted trees. During the first 15 years after timber sale completions, growing shrubs and trees would offer favorable opportunities for nesting songbirds. A greater quantity and diversity of invertebrates would be available during this period, which would benefit bird insectivores.

All temporary roads would be decommissioned. In time, vegetation would fill in the bare ground. Shrubs and trees would provide a vertical structure for nests and foraging.

The short-term effects have been listed above in the direct and indirect effects, and cumulative effects in Alternative 1. Long-term effects up to 150 years would be the recovery period for fire and timber affected areas to produce old growth or mature forested stands. Tree growth (if unaffected by disturbance) would increase the vegetative horizontal and vertical representation in the area, offering increased canopy cover and more diverse structure to the forest. This would benefit all forest-preferring migratory birds. The reduction of road densities would also discourage predation or parasitism of neotropical migrants from species that prefer edge effect habitats: cowbirds, starlings, ravens, and others. The determination for the action alternatives - *some impacts may occur to individuals or their habitat, but is not expected to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.*

3.7 Scenic Quality

3.7.1 Analysis Area

The geographic scope of the scenery analysis for the Johnson Bar Fire Salvage project includes areas visible from key locations both within and outside the area of interest. The spatial context takes in both the Middle Fork Clearwater and the Selway Wild and Scenic River Corridors. Key visual points bounding the visual resource area include the components of both these road corridors. Table 35 and Figure 36 show all key viewpoints or viewing corridors and their sensitivity levels identified in the 1987 Nez Perce National Forest Plan that are relevant to the Johnson Bar Fire Salvage project's scenic quality analysis. Direct and indirect effects analysis focuses on the viewshed and viewpoints from which the proposed activities can be seen, and the extent proposed treatment units affect the visual quality objectives assigned for that piece of ground. The cumulative effects area is similar to that for the direct and indirect effects, except that it takes into account the whole viewshed, as opposed to focusing on the individual units and surrounding area. The temporal scope of the analysis is limited to the 30 to 35 years following harvest activities. This time period is the length of time openings created by regeneration harvest are likely to be evident given the growing conditions of the area.

3.7.2 Regulatory Framework

General direction for scenery management is provided in Forest Service Manual 2380 (Landscape Management). Specific visual resource management direction is provided by the 1987 Nez Perce National Forest Plan and is described in terms of visual quality objectives (VQO). Forest plan VQO standards and guidelines were based on the Visual Management System described in Agriculture Handbook Number 462, National Forest Landscape Management, Volume 2 (PF-Doc. PI-R02). The visual management system was revised in 1995, and is now known as the Scenery Management System. The revised guidelines are provided in Agricultural Handbook 701, Landscape Aesthetics: A Handbook for Scenery Management (USDA Forest Service 1995; PF Doc. VIS-R01). While the terminology of the VQO system will be used to describe the project, the techniques and methodologies described in the Scenery Management System will also be used to analyze the project.

3.7.3 Analysis Methodology

Although the Visual Management System (PF Doc. VIS-R02) has been replaced by the Scenery Management System (PF Doc. VIS-R01), this analysis uses terminology used in the forest plan which was developed and written under the former. A crosswalk between the two systems is found in Agricultural Handbook 701, Appendix A (PF Doc. VIS-R01). Visual quality objectives (VQOs) are based on the area seen from sensitive viewpoints such as travel corridors, urban areas where the forest background scenery is important and other features where there may be a high visual sensitivity level. These visually sensitive viewsheds are illustrated in the 1987 Nez Perce National Forest Plan Visual Quality Objective map. A variety of tools were used in the visual resource analysis including analyzing VQO maps, field visits and visibility modeling.

Using ArcMap 10.2 (ESRI Inc., 1999-2009), GIS shapefiles of harvest units were overlaid on spatially rectified VQO maps displaying scenic variety class, distance zones and sensitivity levels, and quality objectives across the area of interest. Original VOQ maps were prepared for the 1987 forest plan using the process outlined in the Agriculture Handbook Number 462 (1976; PF Doc. VIS-R02).

Treatment units and their associated VQOs were evaluated in relation to visually sensitive viewpoints identified in the forest plan to determine the extent to which proposed activities would likely be seen, and the likelihood that those activities would adversely affect VQOs. VQO maps prepared under the forest plan are very general in nature. Scenic class and sensitivity level can provide a general understanding; however, the maps can't always illustrate how visible specific treatments would be from locations of concern, or the extent to which treatments are likely to stand out or blend with existing scenic features.

Initial field reconnaissance was done to further assess the visibility of potential treatments in the context of the current landscape. Points on VQO maps with direct line of site to treatment units were identified. Units were observed from these locations, using unit maps. Proposed harvest activities are found in all viewing zones when viewed from key viewpoints. To assist in determining unit visibility, the analysis used Google Earth (Google Inc. 2016). Treatment units for each alternative were imported into Google Earth and draped over the landscape. Units were then viewed from ground level or "street view" at a variety of representative sensitive locations, including: U.S. Highway 12 and its associated recreation sites, the Selway Road and its associated recreation sites, Fenn Ranger Station, Forest Road 470 and Lookout Butte Lookout. This 3-D modeling gives a different perspective on how visible a given area is from a specific geographic location. A limitation of using Google Earth for determining visibility is that near view screening from adjacent trees cannot be taken into consideration. For instance, if you are on a trail or road, the 3-D imaging cannot place you down amongst the trees, where your view might be obscured by trees and other vegetation in the foreground. These areas were then field verified and digital photography was compared to the Google images to determine the final effect on the visual resource.

After establishing relative sensitivity of affected areas when viewed from key viewpoints, Agricultural Handbooks 462 and 701 were used as references to determine if proposed activities were likely to modify the landscape to the extent that visual quality objectives could not be met.

3.7.4 Resource Indicators

VQOs provide measurable standards for scenery management in conjunction with demands for goods and services from the forest. Visual resource management is integral to all management areas and implied in all management goals. The forest plan standard relevant to the project area for the Johnson Bar Fire Salvage project are:

1. Meet adopted visual quality objectives (VQOs). Exceptions occur in unusual situations: these are identified through the project planning process involving an interdisciplinary team. Mitigation measures should be developed for areas when VQOs are not met.

2. The visual resource has been evaluated based on visual sensitivity levels assigned to travel routes, use areas and water bodies in and adjacent to the Nez Perce - Clearwater National Forests. Adjustments in the VQO boundaries based on project level analysis would conform to principles in FSM 2380.

The analysis considers the character and appearance of the surrounding natural landscape and the VQOs of areas proposed for treatments as assigned under the current forest plan. VQOs are a desired level of scenic quality and diversity of natural features based on physiological and sociological characteristics of an area, and refers to the degree of acceptable alterations of the landscape. Management activities such as commercial timber harvest and road construction can alter the scenic character of the landscape. There is a potential concern that activities proposed in Alternatives 2, 3 and 4 could adversely affect visual resources to the extent that the VQOs established by the current forest plan (1987) would not be met.

Effects to the visual resource are discussed in general terms; however, the indicator used to measure effects is whether or not VQOs are achieved. Visual quality objectives for the Johnson Bar Fire Salvage Project are listed in Table 35. Below is a brief description of each objective level.

- ***Preservation***: In general, human activities are not detectable to the visitor.
- ***Retention***: Human activities are not evident to the casual Forest visitor.
- ***Partial Retention***: Human activities may be evident, but must remain subordinate to the character of the landscape.
- ***Modification***: Human activities may dominate the characteristic of the landscape but must, at the same time, utilize naturally established form, line, color, and texture.
- ***Maximum Modification***: Human activity may dominate the characteristic landscape, but should appear as natural occurrences when viewed as background.

3.7.5 Spatial and Temporal Context for Effects Analysis

The geographic scope of the scenery analysis for the Johnson Bar Fire Salvage project includes areas visible from key locations both within and outside the area of interest. The spatial context takes in both the Middle Fork Clearwater and the Selway Wild and Scenic River Corridors. Key visual points bounding the visual resource area include the components of both these road corridors. Table 35 and Figure 36 show all key viewpoints or viewing corridors and their sensitivity levels identified in the 1987 Nez Perce National Forest Plan that are relevant to the Johnson Bar Fire Salvage Project's scenic quality analysis. Direct and indirect effects analysis focuses on the viewshed and viewpoints from which the proposed activities can be seen, and the extent proposed treatment units affect the visual quality objectives assigned to that piece of ground. The cumulative effects area is similar to that for the direct and indirect effects, except that it takes into account the whole viewshed, as opposed to focusing on the individual units and surrounding area. The temporal scope of the analysis is limited to the 30 to 35 years following harvest activities. This time period is the length of time openings created by regeneration harvest are likely to be evident given the growing conditions of the area.

3.7.5.1 Connected Actions, Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Openings created by timber harvest activities from past projects are still evident within the area of interest. Although most openings have regenerated, some still appear as distinctive openings with lineal edges. Regeneration harvest began in the 1950s, with additional acreage adding openings to the drainage at regular intervals. A few well-defined geometrically shaped openings are found along the Swiftwater Road and to the north of Goddard Creek. Smaller and less noticeable openings are still visible along the ridgeline above the Middle Fork Clearwater River from viewpoints along U.S. Highway 12. The larger harvest units that are visible in the Swiftwater and Goddard drainages occurred during the late 1980s and early 1990s and now have vigorously growing regeneration in most areas. The smaller units along the Middle Fork were harvested in early 2000 and are more open, but not very evident because of the small size of the openings.

Shelterwood harvest, commercial thinning and pre-commercial thinning have also occurred throughout the drainage. These openings are not as evident since a greater percentage of the canopy has been retained in the openings. It is anticipated that both the regeneration harvest and the thinning openings will no longer be evident within the next 10 to 15 years.

Other management activities such as salvage logging, road construction, and road maintenance have not had a significant visual impact on the viewsheds within the area of interest and therefor have not had a long term effect.

Figure 29. View of Meadow Creek area where multiple fires have created openings in the landscape

The effects of past wildfires and prescribed fires are also visible in the Selway and Middle Fork Clearwater Rivers. The Meadow Creek area, for example, has experienced several larger fires and in some areas has re-burned (Figure 29). The fires created large open areas that have not revegetated. Smaller fire created openings are also evident. It is anticipated that the areas burned by the Johnson Bar fire will eventually have a similar appearance as that seen in the Meadow Creek area. Major fires occurred at the end of the 19th and early in the 20th centuries. The 12,000 acre Johnson Bar Wildfire has been the most significant occurrence since those fires, with the 2015 Wash and Slide fires adding a similar amount of acreage to the burned area the following year.

There has also been areas of private land and a large block of State of Idaho ownership that completed salvage harvesting after the 2014 fires (Figure 30 and Figure 31). In keeping with the requirements of the Wild and Scenic River Management Guides only dead and dying timber was removed, but due to the severity of the fire most of the trees were removed. These areas are within the foreground viewshed of the Selway Wild and Scenic River.


Figure 30. Private harvesting.


Figure 31. State of Idaho harvesting near the Swiftwater Road

3.7.6 Existing Condition

The Johnson Bar area of interest is located approximately 20 miles east of the community of Kooskia, Idaho. The analysis area is part of the Bitterroot Mountain range with its large rivers, moderately steep canyon walls and rolling uplands. The Middle Fork Clearwater canyon has a river course with larger rock features and fairly rapid flowing river. It has steeper canyon walls with a mix of coniferous and deciduous vegetation. The Selway River canyon is broader, with a relatively shallow, slower flowing river. The canyon walls are less steep with more of the rolling uplands visible to the viewer traveling the river corridor. Both the Middle Fork Clearwater and the Selway River are designated wild and scenic rivers. Scenery is listed as one of the outstanding resources to be protected for each river.

The vegetation in the Selway River corridor is mixed coniferous species with deciduous vegetation along the river's edge, especially surrounding the private residences that are located along the river. Many of the river corridors and much of the lower elevation areas have significant populations of western redcedar. Other mixed conifers, composed mostly of grand fir and Douglas fir, are found across the rolling hills adjacent to the streams. There are beach areas and some distinctive rock outcrops along the river corridor. While most of the hillsides have a continuous canopy of coniferous vegetation, but there are areas of open grass and patches of deciduous shrubbery along the steeper hillsides.

During the late summer and early fall of 2014 this area experienced a wide ranging fire event that burned nearly 12,000 acres across the rolling uplands, down most of the major ridgelines of the area of interest and created some fire corridors that reached as far down the ridges to the river's edge (Figure 32 and Figure 33). The intensity of the fire ranged from minimally damaged areas that did not kill the larger trees to areas where no live trees were left in significantly sized areas. This will eventually create a mosaic of openings where there will be just a thinning of the trees to areas where there will be large openings with few if any trees.

Figure 32. Looking southwest toward Goddard Creek from the Selway River, the Johnson Bar fire burned nearly 12,000 acres along the Selway and Middle Fork Clearwater Rivers. Evidence of the fire is now found throughout the corridor.

Figure 33. Moderately steep canyon walls near the mouth of the Selway River. Much of the hillside has been damaged by fire

Recreation users visiting the Lochsa and Selway River areas participate in wide variety of recreation pursuits ranging from dispersed recreation activities such as berry-picking, dispersed camping, driving for pleasure, historical exploration and enjoying the various winter and summer trails in the area to highly organized developed camping, outfitted river experiences and educational group tours. These popular destinations bring thousands of visitors every year. The river canyons form the backdrop of the visitor's recreational setting and scenic quality is of major concern to many of the visitors and residents of the area. Both U.S Highway 12, which makes up the northern border of the area of interest, and the Selway Road #223, found along the northeast boundary of the area, are considered travel corridors with a high concern for scenic quality. The Swiftwater Road #470 is used moderately for recreation purposes and has a moderate concern for scenic quality. Trails 706, 712, 715, and 716 are lightly used and may not still be evident in some areas. Concern for scenery from these corridors would not be considered to be critical.

3.7.6.1 Wild and Scenic River (WSR)

The Selway and Middle Fork Clearwater Wild and Scenic Rivers are known for their scenery and recreational opportunities. These rivers, along with the Lochsa River, were designated as Wild and Scenic Rivers when the Wild and Scenic Rivers Act became law in 1968. The scenery of these river canyons was determined in the designation to be an "outstandingly remarkable value" that contributes to the unique landscape character of these river corridors. The rivers are to be managed to "protect and enhance the values which caused it to be included (Section 10a.)"… in the Wild and Scenic River System.

The landscape character of the Middle Fork Clearwater and Selway Rivers is summarized in this report. The essential components of the landscape character include the landforms, river amenities, and vegetation found in the corridor and all contribute to the determination that scenery is an "outstandingly remarkable value" for the Middle Fork Clearwater and Selway Wild and Scenic Rivers.

3.7.6.2 Past Activities

There is evidence of past harvest activities within the area of interest (Figure 34 and Figure 35). Most of these past harvest activities are still visible but have vegetated to the point that they often don't appear as distinctive openings. While some openings are still evident, they do not tend to dominate the existing landscape character. These openings are in various stages of regeneration but most would take at least 10 to 15 years to appear as only natural timber stands without man-made openings.

Some of the recent fire activity occurred within past harvest units, but the majority of the fire occurred in the heavily forested areas adjacent to past harvest activities or in areas that had no past activity. In the northern portion of the area there are a number of small openings found above the Middle Fork Clearwater River which can been seen, but meet the VQO of *Partial Retention* in the middleground viewing zone from Highway 12, the river corridor and recreation sites along the river. Larger openings can be found along the Swiftwater Road, but are located in the rolling uplands and are not generally visible from either of the river corridors. These openings are evident from the Swiftwater Road itself. While they are evident they do meet the criteria for *Partial Retention* and *Modification* for that road corridor. Additional large openings area found along the ridgeline above Goddard Creek in the southern portion of the area of interest, these openings were created in the 1980s and 1990s and are still evident although they are beginning to appear more natural. This area meets the VQO of *Modification*.

Figure 34. Evidence of past harvest is found throughout the area of interest. While some of the past harvest units appear man-made with straight lines and geometric shapes, many have re-vegetated to the point where many no longer appear as obvious man

Figure 35. Evidence of fire activity near Fenn Ranger Station is very visible from many areas along the Selway Road and its associated recreation areas

3.7.7 Desired Future Condition

The desired condition for scenic quality within the area of interest would be to retain the existing landscape character and maintain the designated visual quality objectives of *Retention, Partial Retention, Modification* and *Maximum Modification* from travel corridors and use areas. The foreground viewing zone of U.S. Highway 12 and the Selway road is *Retention*. These roads roughly make up the northern and northeastern borders of area. Views from the river corridors, road corridors and campgrounds within these important travel ways should maintain a visual condition where openings do not appear man-made. The Swiftwater Road #470 roughly bisects the area of interest and has a sensitivity level of 2. This corridor has the VQO of *Partial Retention* in the foreground and *Modification* in the middle and background views. Harvest activities within the viewing zone of this road can be evident but should not dominate the landscape character of the area.

Table 35 outlines the visual quality objectives listed in the 1987 Nez Perce National Forest Plan.

Table 35. Listing of key viewpoints, their sensitivity level and visual quality objectives found within the Johnson Bar Fire Salvage Project area. Viewpoints or viewing corridors come from the 1987 Nez Perce National Forest plan.

View Point or Viewing Corridor	Sensitivity Level	Foreground 0 – ¼ mi.	Middleground ¼ mi. – 3 mi.	Background 3 mi. – 5+ mi.
U.S. Highway 12	1	Retention	Part. Retention	Modification
- Three Devils Picnic Area	1	Retention	Part. Retention	Modification
- Wild Goose Campground	1	Retention	Part. Retention	Modification
Selway Road #223	1	Retention	Part. Retention	Modification
- Johnson Bar Campground	1	Retention	Part. Retention	Modification
- O'Hara Campground	1	Retention	Part. Retention	Modification
- Cedar Flat	1		Part. Retention	Modification
- CCC Trailhead	1	Retention	Part. Retention	Modification
Coolwater Ridge Road #317	1	Retention	Part. Retention	Modification
Fenn Ranger Station and VC	1	Retention	Part. Retention	Modification
Lookout Butte Lookout	2	Partial Retention	Modification	Maximum Mod.
Road 470 (Swiftwater Road)	2	Partial Retention	Modification	Modification
Trails 706, 712, 715, 716[a]	3	Modification	Modification	Maximum Mod.

[a] A sensitivity level of 3 with a corresponding VQO of Modification in the foreground viewing zone, Modification in the middleground and Maximum Modification in the background viewing zone from these corridors is appropriate for these trails.

All alternatives propose harvest activities within the *Retention* VQO surrounding the Middle Fork Clearwater and Selway Wild and Scenic River corridors. There are a number of proposed harvest units along the Swiftwater Road that are also within MA 17 – timber, visuals management area that will be within the Partial Retention VQO, but the majority of units being proposed for activity are within the *Modification* VQO which forms the middleground and background viewing areas from all the sensitivity viewing areas.

3.7.8 Visual Quality Objectives

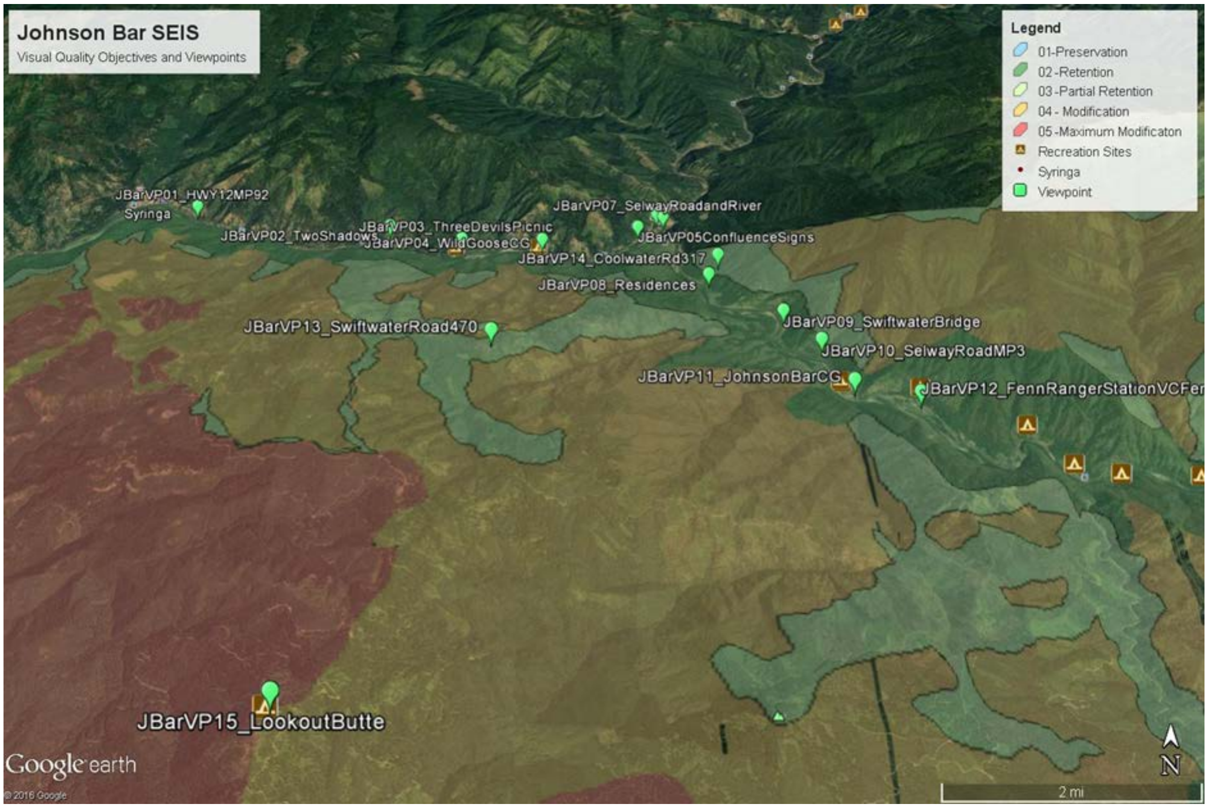

Figure 36. Visual Quality Objectives and viewpoints for the Johnson Bar Fire Salvage project

3.7.9 Direct and Indirect Effects

3.7.9.1 Alternative 1

There would be no man-made change in the scenic quality of the area of interest in alternative 1 in the short term, but the evidence of wildfire would increase with time as more trees succumb to the effects of the 2014 fire. The existing man-made openings would continue to re-vegetate and within 10 to 15 years would no longer appear as distinctly as openings, while the fire affected areas will begin to collapse and new openings created from the fire will be evident. Alternative 1 would not change the existing landscape character of the geographic area encompassed within the Johnson Bar Fire Salvage area of interest.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The Johnson Bar area currently meets the 1987 forest plan visual quality objectives of Retention, Partial Retention and Modification in the foreground, middleground and background viewing zones from all identified viewpoints and viewing corridors, mostly found along the roads and trails encompassed within the wild and scenic river corridors. Although there are currently harvest units that appear as openings they do not dominate the existing landscape character of the area.

Summary of Effects

The effect on the scenic resource in Alternative 1 in the long and short term would be that of the changes related to a natural fire event. These changes would include creation of large and small openings where the fire burned hot enough to kill the trees. The natural openings currently found in the area of interest would continue to increase in size and number as more areas collapse due to the effects of the 2014 fire, eventually appearing as the openings in the Meadow Creek area currently do (Figure 29). Areas where the State of Idaho and private landowners removed the timber would remain apparent in the foreground viewing zone. There would be no changes to the appearance of these openings. The younger stands within existing harvested areas would continue to regenerate, with the man-made harvest areas no longer appearing as openings within 10 to 15 years. Burned areas may take 10 years to begin the revegetation process as the current dead trees fall, and eventually natural regeneration would take place.

3.7.9.2 Effects Common to Alternatives 2, 3, and 4

Transportation System – New temporary road construction is proposed in all alternatives. The development of temporary roads using existing road template will be visible from roads and trails within the area of interest, but will be naturalized after the project is complete and will therefore have no long term effect on the scenic quality of the area. Short tractor swing trails will be required in a few areas. The limited extent of this activity will have minimal visual effects within the overall area of interest and would not dominate the existing landscape character. All new and existing helicopter landings would be reconditioned after use and would not have a significant impact on the scenic conditions of the roadways.

Reconstruction, reconditioning, and system road maintenance of existing roads would have minor evidence of disturbance in the short term, but would have no visual impacts in the long term.

Road decommissioning will occur for both system and non-system roads. While there may be short term visual affects related to decommissioning, the long term effects of this active will be positive for the scenic resources of the area. Putting roads in long term storage will have no significant effects on the scenery of the area.

Site Preparation and Reforestation – All of the proposed harvest areas will be prepared for reforestation and then replanted with appropriate coniferous species. These activities will have a positive long term effect on the area because it accelerates the process of re-vegetation.

Design features used to reduce the visual impact of the harvest areas include retention of vertical structure within the harvest units and edge treatments that emulate natural openings in areas visible from critical viewpoints and travel corridors. Leave trees that provide vertical structure within the harvest area may be both live and dead trees emulating the same structure that would remain after a natural mixed-severity wildfire. These leave areas would range from ¼ to 3 acres in size and may include leave areas adjacent to unit boundaries. Unit boundaries would be shaped and feathered to reduce any unnatural geometric shapes or straight edges that appear as a man-made feature on the landscape.

Foreground screening vegetation along the Swiftwater Road would be protected wherever possible. Protection of screening vegetation at these critical areas would be important during harvesting activities.

Location of skyline corridors and skid trails would be designed to minimize visual impacts.

Compliance with Forest Plan and Other Relevant Laws, Regulations, and Policies - With implementation of the outlined design measures, this alternative would meet the forest plan

Visual Quality Objectives found in Table 35. All Action alternatives would meet the scenic quality requirement of both MA 8.2 within the Wild and Scenic River corridor and MA 17.

3.7.9.3 Alternative 2

Alternative 2 proposes to harvest approximately 2,348 acres within the area of interest using regeneration harvest methods. This harvest will be designed to restore seral species such as western white pine, western larch, and ponderosa pine to areas burned during the mixed severity 2014 Johnson Bar Fire. The proposed harvest activities would remove fire affected trees while leaving both individual and clumps of tree, retaining legacy trees wherever possible. These techniques will emulate openings created by the natural processes of the moderate to severe intensity fire exhibited by the Johnson Bar fire.

Approximately 4% of the harvest would be done using tractor logging, 40% using skyline logging and 56% using helicopter logging. This alternative would also use eleven existing helicopter landings and develop an additional six landings to accommodate the large amount of helicopter based harvest activities. Three of the landings would be within the Wild and Scenic River Corridor.

Direct and Indirect Effects

This analysis is mainly concerned with the landscape that can be observed from viewpoints identified in the forest plan (Table 35 and Figure 36). Proposed activities that are blocked from these viewpoints by terrain are considered to be in compliance with VQOs. Proposed management actions that have concern from a scenic resource standpoint are evaluated for how they conform to naturally occurring features that exist or could be created by natural events. Many of the proposed management features have short term visual effects, but would not have long-term scenic effects. Road maintenance is an example of a management action that rarely has a long-term effect on scenic resources and is covered in actions common to all action alternatives.

The Johnson Bar Fire Salvage area of interest is located within the foreground, middleground and background viewsheds of the Middle Fork Clearwater and Selway Wild and Scenic Rivers, U.S. Highway 12 and the Selway River road and their associated recreation facilities, the Fenn Ranger Station, the Swiftwater Road and other related viewing areas. All of the proposed units would be visible from one or more of the viewpoints found within and surrounding the area of interest.

<u>U.S. Highway 12 and Middle Fork Clearwater Wild and Scenic River</u> – Following the Middle Fork Clearwater River from Syringa to Lowell, Idaho, there are numerous views of the units located on the north-facing portion of the slope. These units include 101, 102, 103, 142, and 143. Major viewpoints include U.S. Highway 12 near Syringa, Two Shadows dispersed site (Figure 37 and Figure 38), Three Devils Picnic Area, Wild Goose Campground, the interpretive sign at the confluence (Figure 39 and Figure 40), and from the Middle Fork Clearwater River. Units 101 and 102 viewed from Wild Goose Campground and unit 103 is viewed from the confluence interpretive site. All these units lie across major ridgelines that are roughly perpendicular to the river corridor. The lower portions of these ridgetop units fall within the *Retention* VQO and the upper portions are generally within the *Partial Retention* VQO. Harvesting would occur, but more stand structure would be retained in the lower portions of the units that fall within the *Retention* VQO. Two helicopter landing sites are proposed within the U.S. Highway 12 corridor. These sites have been used previously used and restored. These would be restored to their original condition when the project is complete.

Portions of units 102, 103 and 143 are within the boundary of the Middle Fork Clearwater Wild and Scenic River. Units 101, 103A, 103B and 144 border the Wild and Scenic River boundary. In addition units 110, 111, 136A, 136B, 137, 138A, 138B, and 142 are visible from the river, but not near the boundary.

Figure 37. View from the Two Shadow viewpoint looking towards the ridgelines affected by fire activity

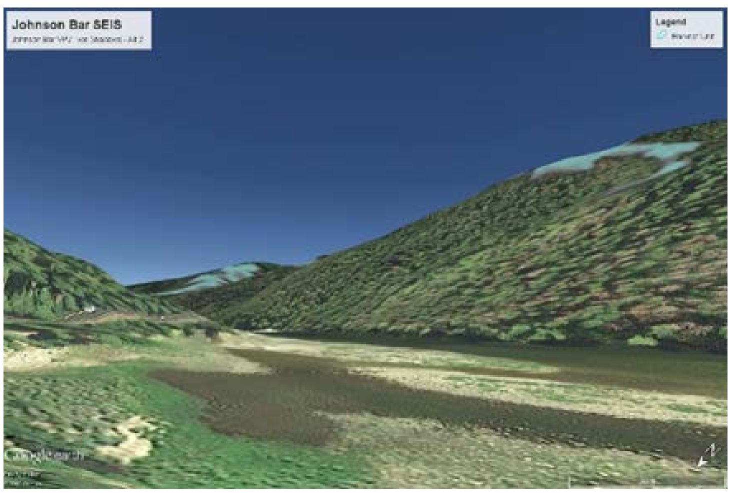

Figure 38. Simulation of units 143 and 101 as they would appear from Two Shadow viewpoint along U.S. Highway 12

Figure 39. Photo of the confluence interpretive site looking downriver

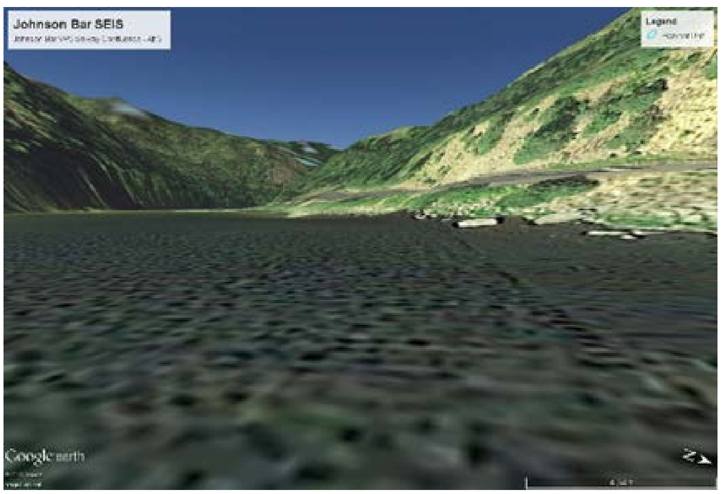

Figure 40. Simulation of the confluence interpretive site looking west. Portions of units 101, 102 and 133 can be seen in the distance

Harvesting would occur along ridgelines affected by fire in the area, but would use natural breaks and retention of groups of trees to more closely emulate the natural openings found within the drainage. Existing roads would be used, so no new roads would be evident. Changes would be visible, but would mimic natural openings and be designed to reduce the visual impact of the harvest methods so the openings would not dominate the existing landscape character of the area of interest. With design features in place, these units would meet the VQO of *Retention* and *Partial Retention* in the foreground and middleground viewing zones from U.S. Highway 12 and the Middle Fork Clearwater River.

<u>Selway River Road and Selway Wild and Scenic River</u> – Along the Selway River the canyon is more open and the canyon walls less steep creating a more open landscape character. Larger portions of the canyon can be viewed for longer periods of time from the roadway and the river. There are numerous residential lots along this corridor in addition to the recreation sites. Foreground views of units 103,104, 126 and 145 will be of greatest concern (Figure 41 through Figure 44). These are also areas where the fire was more active, coming down as far as the river in several places. There will be openings created from the fire both within the harvest units and from the fire activity itself.

Figure 41. Looking northwest from residential area along the Selway River

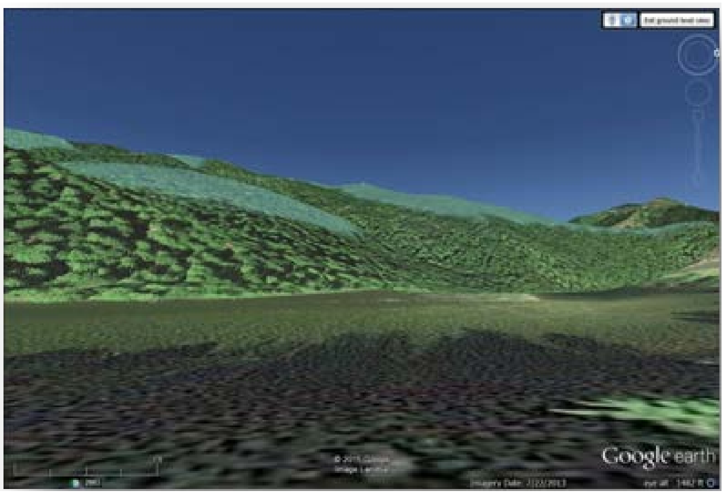

Figure 42. Simulation of units 103 and 104 from the residential viewpoint

Figure 43. View from Fenn Ranger Station looking toward Goddard Creek drainage. The intensity of the fire in this area will create large openings over time

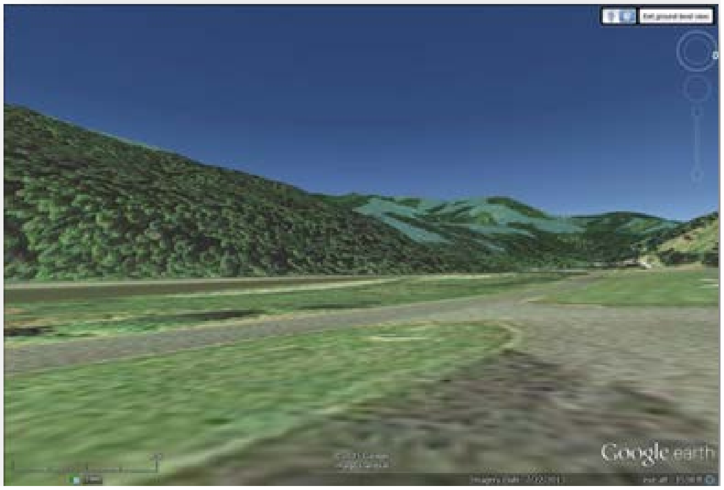

Figure 44. Simulation of the view from Fenn Ranger Station showing the location of unit 126

Harvest units 103, 104, 126 and portions of 116 are within the *Retention* VQO. Again enough stand structure will be retained so that the management activities, while evident to the forest visitor, will emulate the natural patterns created by the fire activity. Removal of the dead material will emulate the natural process of deadfall after a fire of this significance. In the long term, by replanting more quickly, re-vegetation of the area will occur more quickly. Areas further up the slope, within the *Partial Retention* and *Modification* VQOs harvest openings are larger and there will be evident man-made openings, but will these openings remain subordinate to the inherent scenic character with the retention of stand structure and the natural shaping of the openings. In time areas around the units will continue to open up and the overall openings will appear similar to the natural fire openings at Meadow Creek. One existing helicopter landing at Johnson Bar Campground would be used in the Selway River corridor. It would be reconditioned after use.

Portions of units 103, 104, 126, 145C and 145D are within the boundary of the Selway Wild and Scenic River. Units 116, 145A, and 145B border the Wild and Scenic River boundary. In addition units 117. 119, 122D, 129 A-C, 131A, 132B, 133, 134A and 134 C may be visible but do not border the Wild and Scenic River.

Swiftwater Road – Harvest units are located along the entire length of the Swiftwater Road #470 and within the viewshed looking east across the Swiftwater Creek drainage. The Swiftwater Road is a significant travel corridor for recreation use and has a foreground VQO of *Partial Retention* and a middleground VQO of *Modification*. The road passes through units 103, 103A, 103B, 104, 105A, 105B, 106A, 107A, 107B, 110, 111, 136A, 136B, 138A, 138B and 139. There are also views from the road of units 113, 114, 115, 116, 140 and 142 across the Swiftwater drainage. Within the foreground zone, harvest activities can be visible, but should not dominate the existing landscape character. Retention of live trees along the roadway as screening vegetation and use of design measures for development of unit boundaries will be critical to maintain the VQO of *Partial Retention* in the foreground. Units viewed from the roadway across Swiftwater Creek will be designed to appear as natural openings through retention of live trees where possible. Areas of intense fire activity will have larger openings along the ridgetops so harvest activities may begin to dominate the existing landscape character (Figure 45 and Figure 46. This would still meet the VQO of *Modification* in the middleground. Fourteen new and existing helicopter landings would be developed adjacent to existing and proposed permanent and temporary roadway. These sites would be reconditioned after use and would not be a significant change in the visual condition of the roadway.

Figure 45. Views across Swiftwater Creek from Road 470 showing larger areas of intense fire activity.

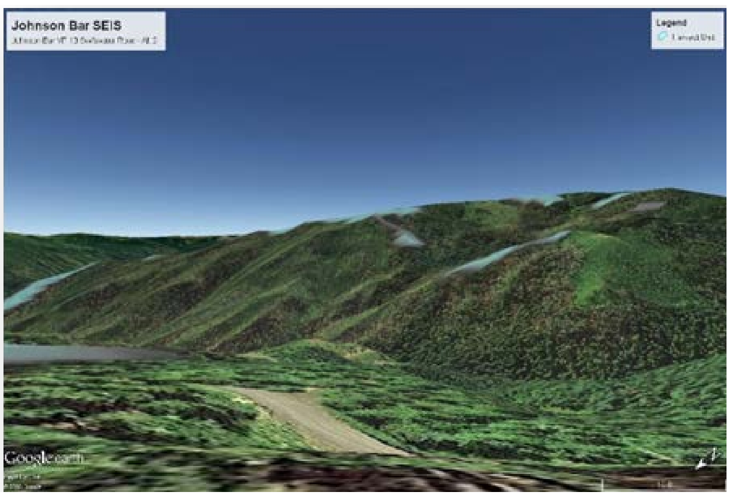

Figure 46. Simulation of units 114, 115 and 116 as viewed from the Swiftwater Road.

Elk City and Goddard Creek Drainages – These two large drainages have large areas of intense fire activity, especially along the ridgetops. There are no major roads or trails that are recreation destinations and are in the far middleground or background view from the river corridor and therefore have a VQO of *Modification*. Units within these drainages will have unit boundaries that appear as natural openings, but they will be larger and will have fewer tree retained. Units within this area include 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, 134, 135 and 145 (Table 36).

Table 36. Effects of harvest units and proposed treatments of fire salvage on Scenic Quality in Alternative 2

Units	Range of Canopy Cover (percent)	Seen from Critical Viewpoint?	Forest Plan Visual Quality Objective
U.S. Highway 12 and Middle Fork Clearwater Wild and Scenic River – 101, 102, 103, 143, 144	Varies depending existing dead and dying vegetation	Yes; U.S. Highway 12, Three Devils Picnic Area, Wild Goose Campground, and the confluence interpretive site. Units 102, 103 and	Retention in the foreground, partial retention in the middleground and modification in the background

Units	Range of Canopy Cover (percent)	Seen from Critical Viewpoint?	Forest Plan Visual Quality Objective
		143 are within the boundary of the MF of the Clearwater WSR. Two existing helicopter landings would be used and reconditioned.	
Selway River Road and Selway Wild and Scenic River – 103,104, 116, 126, 145	Varies depending on severity of fire and existing dead and dying vegetation	Yes; the Selway River road, Johnson Bar Campground, Fenn Ranger Station and VC, CCC Trailhead and O'Hara Campground. Units 103, 104, 126, 145A and 145C are within the boundary of the Selway WSR. One existing helicopter landing at Johnson Bar Campground would be used and reconditioned.	Retention in the foreground, partial retention in the middleground and modification in the background
Swiftwater Road and Lookout Butte - 104, 105, 106, 107, 109, 109, 110, 111, 112, 113, 114, 115, 116, 136, 137, 138, 139, 140142	Varies depending on severity of fire and existing dead and dying vegetation. Areas affected are larger and more prevalent in this drainage.	Yes; from Road 470 and the Lookout Butte access road. Fourteen new and existing helicopter landings would be used and reconditioned between this drainage and the Elk City/Goddard Creek drainages. These would be reconditioned after use.	Partial Retention in the foreground and Modification in the middle and background
Misc. roads and trails within the Elk City and Goddard Creek drainages – 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, 134, 135	Varies depending on severity of fire and existing dead and dying vegetation	No; activities viewed from minor roads and trails that are not listed as sensitive travel corridors. Units 117, 118, 119, 120, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, and 135 may be visible from the WSR but do not border the boundary of the Selway WSR.	Modification

3.7.9.4 Alternative 3

Alternative 3 proposes to harvest approximately 1988 acres within the area of interest using regeneration harvest methods. This harvest will be designed to restore seral species such as western white pine, western larch, and ponderosa pine to areas burned during the mixed severity 2014 Johnson Bar Fire. The proposed harvest activities would remove fire affected trees while leaving both individual and clumps of tree, retaining legacy trees wherever possible. These techniques will emulate openings created by the natural processes of the moderate intensity fire exhibited by the Johnson Bar fire.

Approximately 1% of the harvest would be done using tractor logging, 22% using skyline logging and 77% using helicopter logging. This alternative would also use eleven existing helicopter landings and develop an additional three landings to accommodate the large amount of helicopter based harvest activities.

Direct and Indirect Effects

This alternative is very similar to Alternative 2 (Table 37). Harvest activities have been reduced with the elimination of unit 116 and reduction of the size of unit 104, located adjacent to the Selway Road. This unit was within the *Retention* VQO. There was still fire activity within the area of the unit so it still may appear as an opening as the fire damaged trees die and fall to the ground, but the change will occur over a longer period of time. There are also more areas proposed for helicopter harvest reducing the area that will be harvested using skyline methods. There are 3 new helicopter landings proposed and there would be use of 11 existing landings similar to what was proposed in Alternative 2.

Table 37. Effects of harvest units and proposed treatments of fire salvage on Scenic Quality in Alternative 3

Units	Range of Canopy Cover (percent)	Seen from Critical Viewpoint?	Forest Plan Visual Quality Objective
U.S. Highway 12 and Middle Fork Clearwater Wild and Scenic River – 101, 102, 103, 143, 144	Varies depending existing dead and dying vegetation	Yes; U.S. Highway 12, Three Devils Picnic Area, Wild Goose Campground, and the confluence interpretive site. Units 102, 103 and 143 are within the boundary of the MF of the Clearwater WSR. Two existing helicopter landings would be used and reconditioned.	Retention in the foreground, partial retention in the middleground and modification in the background
Selway River Road and Selway Wild and Scenic River– 103,104,126, 145	Varies depending on severity of fire and existing dead and dying vegetation	Yes; the Selway River road, Johnson Bar Campground, Fenn Ranger Station and VC, CCC Trailhead and O'Hara Campground. Units 103, 104, 126, 145A and 145C are	Retention in the foreground, partial retention in the middleground and modification in the background

Units	Range of Canopy Cover (percent)	Seen from Critical Viewpoint?	Forest Plan Visual Quality Objective
		within the boundary of the Selway WSR. One existing helicopter landing at Johnson Bar Campground would be used and reconditioned.	
Swiftwater Road and Lookout Butte - 104, 105, 106, 107, 109, 109, 110, 111, 112, 113, 114, 115, 136, 137, 138, 139, 140142	Varies depending on severity of fire and existing dead and dying vegetation. Areas affected are larger and more prevalent in this drainage.	Yes; from Road 470 and the Lookout Butte access road. Eleven new and existing helicopter landings would be used and reconditioned between this drainage and the Elk City/Goddard Creek drainages. These would be reconditioned after use.	Partial Retention in the foreground and Modification in the middle and background
Misc. roads and trails within the Elk City and Goddard Creek drainages – 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, 134, 135	Varies depending on severity of fire and existing dead and dying vegetation	No; activities viewed from minor roads and trails. Units 117, 118, 119, 120, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, and 135 may be visible from the WSR but do not border the boundary of the Selway WSR.	Modification

3.7.9.5 Alternative 4

Alternative 4 proposes to harvest approximately 1,349 acres within the area of interest using regeneration harvest methods. This harvest will be designed to restore seral species such as western white pine, western larch, and ponderosa pine to areas burned during the mixed severity 2014 Johnson Bar Fire. The proposed harvest activities would remove fire affected trees while leaving both individual and clumps of tree, retaining legacy trees wherever possible. These techniques will emulate openings created by the natural processes of the moderate intensity fire exhibited by the Johnson Bar fire.

Approximately 8% of the harvest would be done using tractor logging, 57% using skyline logging and 35% using helicopter logging. This alternative would use new and existing helicopter landings to accommodate the large amount of helicopter based harvest activities. There are three new and six existing helicopter landings proposed for this alternative. None of the helicopter landings are located in the Wild and Scenic River Corridor.

Direct and Indirect Effects

Harvest activities have been reduced with the elimination of units 101, 102, 143 and 144 within the viewshed of U. S Highway 12 (Table 38). Within the Selway River viewshed unit 116 will be greatly reduced and unit 126 will be eliminated. These units are within the *Retention* VQO. All harvest activities within the Wild and Scenic River boundary have been eliminated. There was still fire activity within the area of the unit so it still may appear as an opening as the fire damaged trees die and fall to the ground, but the change will occur over a longer period of time. There are fewer areas proposed for helicopter harvest and the area harvested using skyline methods will be increased.

Table 38. Effects of harvest units and proposed treatments of fire salvage on Scenic Quality in Alternative 4

Units	Range of Canopy Cover (percent)	Seen from Critical Viewpoint?	Forest Plan Visual Quality Objective
U.S. Highway 12 and Middle Fork Wild and Scenic River – 103 A, B and C	Varies depending existing dead and dying vegetation	Yes; U.S. Highway 12 at the confluence interpretive site. There are no units or helicopter landings within the Wild and Scenic River Boundary.	Retention in the foreground, partial retention in the middleground and modification in the background
Selway River Road and Selway Wild and Scenic River – 103,104, 145	Varies depending on severity of fire and existing dead and dying vegetation	Yes; the Selway River road, Fenn Ranger Station and VC, CCC Trailhead and O'Hara Campground. There are no units or helicopter landings within the Wild and Scenic River Boundary.	Retention in the foreground, partial retention in the middleground and modification in the background
Swiftwater Road and Lookout Butte - 104, 105, 106, 107, 109, 109, 110, 111, 112, 113, 114, 115, 136, 137, 138, 139, 140142	Varies depending on severity of fire and existing dead and dying vegetation. Areas affected are larger and more prevalent in this drainage.	Yes; from Road 470 and the Lookout Butte access road. There are nine new and existing helicopter landings in this drainage and the adjacent Elk City and Goddard Creek Drainages.	Partial Retention in the foreground and Modification in the middle and background
Misc. roads and trails within the Elk City and Goddard Creek drainages – 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, 134, 135	Varies depending on severity of fire and existing dead and dying vegetation	No; activities viewed from minor roads and trails. Units 117, 118, 119, 120, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, and 135 may be visible from the WSR but do not border the boundary of the Selway WSR	Modification

3.7.10 Cumulative Effects

Present and foreseeable management projects that may affect scenic quality in the area include: Clear Creek Burn, Tinker Bug Timber Sale, Woodrat Timber Sale, Clear Creek Restoration, Lowell WUI, Horse Creek, Iron Mountain Stewardship, O'Hara Hazard Tree Removal, Road, Administrative, and Recreation Site Maintenance project, and three prescribed burns – Fenn Face, North Selway, and West Meadow. All these project have been or will be designed to meet the VQOs designated for its particular areas of interest. While none of the harvest units from this project are immediately adjacent to units proposed in this project, there are some within a mile of the Johnson Bar Fire Salvage Project. The visual impact of the harvest proposed in these projects on the Johnson Bar Fire Salvage area of interest would be minor due to the design measures that will be developed for the roads and trails within the Middle Fork Clearwater and SelwayWild and Scenic River areas. The size and shape of the openings within the listed projects will be design to reflect the existing landscape character. There would therefore be no impact on the visual condition of the viewshed from these present and foreseeable future projects.

Other past, present and future activities including tree planting, public use, road reconstruction and maintenance, trail construction and maintenance, pre-commercial timber stand improvements, and private land activities would have no significant effect on the visual condition of the area of interest because they do not create large enough man-made openings to alter the inherent landscape character to the degree that it would become a dominate visual element within the viewshed.

The effects of past wildfires and prescribed fires are also visible in the Selway and Middle Fork Clearwater Rivers. The Meadow Creek area, for example, has experienced several larger fires and in some areas has re-burned. The fires created large open areas that have not revegetated. Smaller fire created openings are also evident. It is anticipated that the areas burned by the Johnson Bar fire will eventually have a similar appearance as that seen in the Meadow Creek area. Major fires occurred at the end of the 19th century with smaller fires happening in more isolated areas. The 12,000 Johnson Bar Wildfire has been the most significant occurrence, with the 2015 Wash and Slide fires adding a similar amount of acreage to the burned area the following year.

There has also been areas of private land and a large block of State of Idaho ownership that completed salvage harvesting after the 2014 fires. In keeping with the requirements of the Wild and Scenic River Management Guides only dead and dying timber was removed, but due to the severity of the fire most of the trees were removed. These areas are within the foreground viewshed of the Selway Wild and Scenic River.

3.7.10.1 Alternative 1

There would be no man-made change in the scenic quality of the area of interest in Alternative 1 in the short term, but the evidence of wildfire would increase with time as more trees succumb to the effects of the 2014 fire. The existing man-made openings would continue to re-vegetate and within 10 to 15 years would no longer appear as distinctly as openings, while the fire affected areas will begin to collapse and new openings created from the fire will be evident. Areas of State of Idaho and private lands harvested after the fire would appear as openings for 25 to 35 years depending on the effectiveness of revegetation efforts. Alternative 1 would not change the existing landscape character of the geographic area encompassed within the Johnson Bar Fire Salvage area of interest.

3.7.10.2 Alternative 2

Past harvest activities are visible throughout the area of interest and are viewed from the Middle Fork Clearwater and Selway Wild and Scenic Rivers, U.S. Highway 12, the Selway River road, the Swiftwater road and associated recreation and residential sites. Most proposed units within the Johnson Bar Fire Salvage Project will be also be visible to some extent from the Wild and Scenic Rivers, road, trails and recreation sites within the area of interest. With design measures, the openings while visible, will emulate openings created by natural fire events. Openings will be visible but will reflect the size and shape of natural fire activity, since only dead and dying trees from the 2014 fire will be removed. Use of helicopters to harvest critical units within retention areas will reduce the visual effects of the harvest activities and will leave more natural openings. In critical viewshed more stand structure will be retained and logging activities such as skyline logging pathways will be minimize. Areas of State of Idaho and private lands harvested after the fire would appear as openings for 25 to 35 years depending on the effectiveness of revegetation efforts. Where proposed harvest units are located near the State of Idaho and private land openings, the edges will be feathered to reduce any unnatural edges. Given the aspect and growing history of the area, the openings created by this proposal would no long appear as openings within 30 to 35 years, but should appear as an area that has experienced the natural process of wildfire rather than man-made, geometric openings.

Harvest activities proposed for this project would be visible from several viewpoints (Figure 36) but would be designed to emulate the openings created by natural processes within the area. Openings would be designed to appear natural with feathered edges and groupings of trees. Long term the openings will improve the health and resilience of the forest and will speed the recovery process after the Johnson Bar fire without changing the existing landscape character significantly. While the openings would be apparent they would not dominate the existing landscape character of the area, especially in the foreground viewing zone. Given the design measures outlined for all visible units, Alternative 2 would meet the forest plan visual quality objectives found in the forest plan.

Wild and Scenic River – Within the Middle Fork Clearwater and the Selway Wild and Scenic River corridors there are eight units that are partially within the boundary of the Wild and Scenic River. All of these units are mostly within the area that borders the Wild and Scenic River boundary. There are also seven additional units that border the Wild and Scenic River corridor, but do not have any opening within the boundary. There are sixteen units that may be partially visible from the Wild and Scenic River but do not border the boundary. Most of these openings are small and duration of view would be short. Areas adjacent to existing State of Idaho and private harvest would be feathered to emulate natural fire openings. With design measures these openings would maintain the ORVs for the Wild and Scenic River corridor.

3.7.10.3 Alternative 3

The cumulative effects of Alternative 3 would be similar to Alternative 2 with the exception of the reduction of harvest activity within the foreground viewing area of the Selway Road (Unit 116 and reduction in Unit 104) and the use of approximately 10% more helicopter harvesting methods rather than skyline yarding. Use of helicopters to harvest critical units within retention areas will reduce the visual effects of the harvest activities and will leave more natural openings. Effects for alternative 3 are similar to alternative 2 with a slight reduction in the number of overall units proposed within the *Retention* VQO. Areas of State of Idaho and private lands harvested after the fire would appear as openings for 25 to 35 years depending on the effectiveness of revegetation efforts. Where proposed harvest units are located near the State of

Idaho and private land openings, the edges will be feathered to reduce any unnatural edges (Table 37).

Wild and Scenic River – Within the Middle Fork Clearwater and the Selway Wild and Scenic River corridors there are eight units that are partially within the boundary of the Wild and Scenic River. All of these units are mostly within the area that borders the Wild and Scenic River boundary. There are also six units that are bordering the Wild and Scenic River corridor, but do not have any opening within the boundary. There are sixteen units that may be partially visible from the Wild and Scenic River but do not border the boundary. Most of these openings are small and duration of view would be short. With design measures these openings would maintain the ORVs for the Wild and Scenic River corridor.

3.7.10.4 Alternative 4

The cumulative effects of Alternative 4 will be similar to Alternative 2 and 3 in the Swiftwater road area and the Elk City Creek and Goddard Creek drainages. However; there will be significant reduction in visual impacts in the U. S. Highway 12 corridor and the Selway corridor with the elimination of the units within the foreground viewing area (*Retention* VQO). Alternative 4 will also use more skyline harvest methods which may be more evident from viewing corridors.

Effects for alternative 4 are similar to alternative 2 and 3 in the more southerly portions of the area of interest in areas of *Partial Retention and Modification* VQOs. There is a significant reduction in the number of units proposed within the *Retention* VQO, especially within the Wild and Scenic River Corridor (there is no proposed harvest in the Corridor). Areas of State of Idaho and private lands harvested after the fire would appear as openings for 25 to 35 years depending on the effectiveness of revegetation efforts (Table 38).

Wild and Scenic River – Within the Middle Fork Clearwater and the Selway Wild and Scenic River corridors there are no units or helicopter landings within the boundary of the Wild and Scenic River. There are eight units that are bordering the Wild and Scenic River corridor. There are also sixteen units that may be partially visible from the Wild and Scenic River but do not border the boundary. Most of these openings are small and duration of view would be short. With design measures these openings would maintain the ORVs for the Wild and Scenic River corridor.

Summary of Effects to the Scenery ORV: All action alternatives would contribute to openings of varying sizes and shapes in areas that are highly visible, but were affected by the Johnson Bar fire of 2014. Design measures would be implemented so that openings created through harvest would emulate the natural openings created by previous fire events in the river corridor, such as those found in the Meadow Creek drainage (see

Appendix H – Photos). These openings will be visible, but will appear very similar to the openings in the river corridor that were created by natural fire processes in the past. Most of the areas affected by the fire will appear as openings eventually, whether they are harvested by man or not. Over time the natural regeneration process will introduce coniferous vegetation back to the canyon, but this process can take decades. This revegetation process would be accelerated in areas of harvest that are then replanted after harvest was completed. In Alternative 2 and to a lesser extent Alternative 3, some of the edges of the State of Idaho and private land harvested would be feathered more effectively as the proposed harvest activities area completed along those edges.

3.8 Wild and Scenic Rivers

3.8.1 Analysis Area

The Johnson Bar Fire Salvage project area is 26,800 acres located south of the Middle Fork Clearwater River and west of the Selway River near the confluence of the Selway and Lochsa Rivers. The analysis area for the Wild and Scenic River includes that portion of the Wild and Scenic River within the Project area plus the adjacent Wild and Scenic River area located on the opposite side of the river.

3.8.2 Regulatory Framework

3.8.2.1 Wild and Scenic Rivers Act

The project area includes a portion of the Middle Fork Clearwater (Including the Lochsa and Selway Rivers) Wild and Scenic River. This river is managed consistent with its designation in accordance with PL 90-542, as amended 16 U.S.C. 1271-1287.

Management direction is found in Section 10(a) of the Wild and Scenic Rivers Act:

Each component of the national Wild and Scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other such uses that do not interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting aesthetic, scenic, historic, archaeologic, and scientific features. Management Plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area.

The Middle Fork Clearwater Wild and Scenic River has a River Plan as required by the Wild and Scenic Rivers Act (Sec 3) and outlines site specific management direction for the river corridor. Management Guides and a River Management Plan were prepared in 1973 and 1969 respectfully, to guide management of the river corridor. The Clearwater Forest Plan and River Plan standards applicable to this project are shown in the Regulatory Compliance of this document. To avoid duplication management direction applicable to this project is shown in Table 39 and Table 40 below.

There are no eligible Wild and Scenic Rivers within or adjacent to the Johnson Bar Salvage area.

3.8.2.2 Forest Plan

Table 39. Regulatory compliance with the Forest Plan.

Forest Plan Standard Number	Subject Summary	Evaluation of Compliance
Forest-Wide Standards Wild, Scenic and Recreation Rivers (Forest Plan pg. II-22-23)		
1	Maintain or enhance the recreation, visual, wildlife, fisheries, and water quality values of the existing and proposed "Wild," "Scenic," and "Recreation" Rivers.	Design criteria developed for the Johnson Bar Fire Salvage project would provide adequate protections for these resources. In most cases the project would have no adverse effect on the ORVs for the river corridor. Impacts to recreation would be temporary and primarily associated with log haul on main roads within the corridor (Selway Road 223 and US Highway 12). Use of helicopter landings within the corridor with Alternatives 2 and 3 would be limited to avoid the high recreation use periods. Alternative 4 would not use helicopter landings within the corridor. For Alternative 4, impacts to visual resources would be primarily associated with Units 103 and 104 located near the confluence of the Lochsa and Selway Rivers. Design criteria assure that, while the openings will be visible, they would emulate natural fire process and therefore would meet visual quality objectives for the river corridor. Impacts to Wildlife and Fish habitat and populations would not be adversely affected (see Wildlife and Fisheries reports). Water quality within the Selway and Middle Fork Clearwater Rivers would not be adversely affected (see Fisheries, Hydrology and Soils Reports).

Forest Plan Standard Number	Subject Summary	Evaluation of Compliance
3	Generally, no management practices are scheduled in the waterway corridors which are normally defined as the seen area up to ¼ mile either side of the channel.	Alternatives 2 and 3 would harvest 168 and 143 acres respectively within the Wild and Scenic River corridor. Alternative 4 would not harvest in the river corridor. Portions of these units would be seen and have been addressed in the Scenery Management report. Design criteria assure the visual quality objectives would be met. See also Management Area 8.2 Timber standards below.
4	New road construction and timber harvest are excluded in the “Wild” River Corridors, and very limited in ”Scenic” and “Recreation” River Corridors.	No new roads are proposed within the “Recreational” corridor in Alternative 3 and 4. There are two temporary roads (units 103 and 104) that are within the corridor in alternative 2. These roads would be recontourted after harvest. Alternatives 2 and 3 would harvest 168 and 143 acres respectively within the Wild and Scenic River corridor. Alternative 4 would not harvest in the river corridor. There would be minimal helicopter landings within the WSR corridor that would be utilized. No helicopter landings would be utilized in the WSR corridor in the preferred alternative.
6	Manage for recreation experiences in context with the existing or proposed designation. "Wild" - primitive or semiprimitive nonmotorized. "Scenic" - semiprimitive motorized or semiprimitive nonmotorized. "Recreation" - semiprimitive motorized or roaded natural.	The portions of WSR within the project area are classified as Recreational. The Recreation and Trails report describes the existing Recreation Opportunity Spectrum and that there would be no effect or change to ROS.
Management Area 8.2 Standards (Forest Plan pg. III-19-21)		
Recreation 2	Recreation Segment: Manage for roaded natural appearing or semiprimitive motorized recreation.	See Forest-wide Standard #6. The project area is within the Roaded Natural ROS.

Forest Plan Standard Number	Subject Summary	Evaluation of Compliance
Recreation 4	Identify and protect historic, scenic, geologic, and archaeological sites.	The Cultural Resources report identifies historic and archeological sites that require protection. Design criteria for the project require that these sites be avoided, therefore they are protected. The Scenery Management report addresses the visual impacts of harvest within the WSR corridor. Design criteria would assure Visual Quality Objectives are met. No geologic sites are in the project area.
Recreation 5	Recreation Segment: Manage for retention visual quality objective.	The Scenery Management report addresses how Retention VQOs would be met for the harvest units located within the WSR corridor.
Wildlife and Fish 1	Restore degraded anadromous and resident fish habitat.	See Fisheries report. The Forest Plan Appendix A requires an upward trend in habitat conditions for certain watersheds in the project area. A suite of road decommissioning projects would lend progress toward the required upward trend. None of those projects, however are located within the WSR corridor.
Timber 1	Lands are classified as "unsuitable" for timber management; do not schedule timber harvest.	The Johnson Bar Fire Salvage project was not scheduled as part of the annual sale quantities. This project is in direct response to the wildfire and opportunities to respond to landscape conditions. All lands proposed for treatment are classified as “suitable”.
Timber 2	Recreation Segment: Exclude timber harvest except for (a) public safety and/or recreational purposes in selected areas; (b) **control of fire, insects and disease** when such cutting is the only practical method of control; (c) approved access facility locations.	The Fuels and Silvicultural reports reveal the potential for portions of the project area to re-burn if no action is taken to address the existing burned timber. The Johnson Bar Fire Salvage is designed to address future fire control issues associated with increased fuel load caused by the wildfire and to protect private lands from exposure to future wildfires.
Water 1	Meet established fishery/water quality objectives for all prescription watersheds as shown in Appendix A.	See Wildlife and Fish Standard #1 above

Forest Plan Standard Number	Subject Summary	Evaluation of Compliance
Facilities 3	Recreation Segment: Maintain or reconstruct [trails] to enhance recreation values, user safety, and reduce environmental damage.	See Recreation and Trails Report. Portions of two trails (706 and 712) are located within the WSR Corridor. The portion of Trail 706 within the WSR corridor is located on State land without a trail easement. It is unknown whether the trail would be reconstructed. The portion of Trail 712 located within the WSR Corridor would not be affected by harvest activities and would be maintained on an infrequent basis.
Protection 1	Recreation Segment: Treat infestations [of insects and disease] that threaten recreation values or adjacent "suitable" or private lands.	The Johnson Bar Fire Salvage project would address existing and potential future insect and disease populations, by removing insect infested trees and dying trees that would attract new insect populations. Indications are that the fire itself burned over many of the insect population areas that existed prior to the fire. Increased insect populations are expected with the No Action alternative.

3.8.2.3 Middle Fork Clearwater Wild and Scenic River Plan

Table 40. River plan standard compliance.

Standard Number	Subject Summary	Evaluation of Compliance
River Plan General Coordinating Requirements (River Plan pg 5-10)		
Recreation 4	Identify and protect historic, scenic, geologic, archaeologic and similar sites or areas.	See Management Area 8.2 Recreation #4 above.
Timber 1	Consider timber for recreation, watershed protection and esthetic values rather than for commercial production.	Approximately 1,300 acres of the 2,100 acre Wild and Scenic River Corridor was burned Alternatives 2 proposed to harvest about 168 acres or 13 percent of the burned area nd Alternative 3 would harvest about 143 acres or 11 percent of the burned area. Alternative 4, the preferred alternative, would not harvest any burned areas within the designated WSR corridor. Approximately 90 percent of the burned area would be retained untreated to provide trees on the landscape for other purposes. These burned trees will likely fall down over the course of the next 1 to 20 years and would contribute to increased risk for re-burn. See Fuels Report.

Standard Number	Subject Summary	Evaluation of Compliance
Timber 2	Commercial timber harvest will generally be confined to areas outside the boundaries of the river area. Commercial operations could be needed to meet objectives under recreational river coordinating requirements.	See Recreation River Coordinating Requirements Timber #1 below.
Water 2	Protection of rivers will include controlling pollution, debris accumulation and siltation to the degree necessary to maintain the water quality within defined parameters or measurable units.	See Management Area 8.2 Wildlife and Fish Standard #1 above.
Transportation 2	Locate roads and trails to avoid encroachment on river banks and to harmonize with objectives for which the river area is established.	Construction of two short temporary roads are proposed in Alternative 2 on ridge areas not seen from the river. No new trails are proposed. No new roads or trails would be constructed in the WSR Corridor in Alternatives 3 and 4.
River Plan Recreation River Coordinating Requirements (River Plan pg 10 - 14)		
Timber 1	Timber cutting will be done only for the following: a) Public safety and/or recreational purposes in selected areas. b) Control of fire, insects and disease when such cutting is determined to be the only practical method of control. c) [with]Approved road and trail locations.	See Management Area 8.2 Timber #2 above.
Timber 2	Timber cutting will be compatible with or enhance key recreational and scenic values	See Forest-wide Standards #1 above.

Standard Number	Subject Summary	Evaluation of Compliance
Timber 3	The value of standing trees for watershed, aesthetic or other recreational purposes will be considered in the choice of measures for controlling fire, insects and disease.	There are 2,100 acres of designated Wild and Scenic River Corridor within the project area. Approximately 1,300 acres or 60% of that areas was burned. Alternative 2 would harvest 168 acres or 13% of the burned area within the corridor. Alternative 3 would harvest 143 acres or 11% of the burned area. Alternative 4 would not harvest any burned areas within the corridor. Only dead and dying trees would be harvested leaving all live trees to emulate natural fire patterns. In addition, approximately 85-90 percent of the burned area would remain untreated to provide trees on the landscape for other purposes in Alternatives 2 and 3 and 100% in Alternative 4. These burned trees will likely fall down over the course of the next 1 to 20 years and would contribute to increased risk for re-burn in about 20 years. See Fuels Report.
Water 2	Coordination with all agencies, State and Federal, private landowners and water users will be necessary to protect water quality.	See Management Area 8.2 Wildlife and Fish Standard #1 above.
Water 3	Modify projects within the river system if necessary to insure high water quality	See Management Area 8.2 Wildlife and Fish Standard #1 above.
Water 4	Gullied, eroding stream, polluted water and vegetation and soil disturbed by humans, domestic animals, wildlife, large burns and landslides are examples of undesirable watershed conditions in classified river areas. Where these conditions have a major impact on river values they should be restored.	See Silvicultural Report. See Scenery Management Report. One of the objectives of harvest is to accelerate the rate of tree recovery over natural processes (no action). Alternative 2 and 3 would harvest areas within the Wild and Scenic River corridor, then plant seedlings within the openings, jump starting tree recovery. Natural processes would dictate stand recovery in Alternative 4 within the Wild and Scenic boundary. There would be openings harvest that border the boundary.
Water 5	All watershed improvement projects will be designed as to location, type of treatment and work methods to insure compatibility with the free-flowing intent of the Wild and Scenic Rivers Act.	No projects are proposed that would affect free-flow.
Wildlife and Fish 1	Provide an appropriate habitat to sustain a variety of wildlife for public enjoyment	See Wildlife Report. No adverse effects to any wildlife population or habitat component is anticipated.
Management Guides		

Standard Number	Subject Summary	Evaluation of Compliance
Guidelines (pg 32 – 43)		
Recreation 12	Shorelines must remain essentially primitive in Wild River zones and fully protected within the Recreation River zone.	Design criteria for the project include PACFISH buffers on stream-side zones. No harvest is proposed within 300 feet of the Selway or Middle Fork Clearwater River.
Timber 1	Timber cutting in the Recreation River areas will be for recreation, fire control, and for other essential management purposes rather than for commercial production.	See Silviculture Report. See Fuels Report. One of the objectives of harvest is to accelerate the rate of tree recovery over natural processes (no action). Alternative 2, 3 and 4 would harvest then plant jump starting tree recovery in areas within and bordering the Wild and Scenic River corridor. Alternatives 2, 3 and 4 would also remove trees to reduce fuel buildup and future wild fire risk near private lands.See also River Plan Recreation River Coordinating Requirements Timber #3 above.
Timber 3	Timber harvest and any other vegetative changes in the Recreational River zone are to be directly toward maintaining a viable, attractive forest environment.	See Silviculture Report. See Scenery Management Report. One of the objectives of harvest is to accelerate the rate of tree recovery over natural processes (no action). Alternative 2, 3 and 4 would harvest then plant, jump starting tree recovery in areas within and bordering the Wild and Scenic River corridor. The planting of larch would provide more visual fall color diversity to the tree cover along the river corridor. Larch natural regeneration would be limited due to a lack of seed source, so this color diversity would not occur under the no action alternative.
Timber 4	When cutting is necessary, the actual cutting practices are to be determined on an "area by area" basis. A thorough analysis of stand conditions, soils, topography, and especially the impact on scenery and other recreational values will be required in each case. The following general requirements apply: • Cutting units are to be designed to avoid large openings in the canopy unless such openings will enhance the landscape. • Treat all slash and debris promptly and completely to reduce the hazards of fire, insect	Design criteria for meeting visual quality objectives would result in openings that emulate the natural processes associated with a wildfire event within the Wild and Scenic River Corridor. The openings would be apparent, but would follow the natural fire pattern and appear as natural fire openings rather than man-made openings. Design Criteria provide for timely treatment of slash and debris. Some slash would be intentionally left within harvest units to provide cover and protection of soils. Landing slash would be 100% treated to

Standard Number	Subject Summary	Evaluation of Compliance
	and disease and to protect visual values. • Control; timber harvest methods that leave the least possible visual impact. Avoid locating logging roads and skid trails within river boundary viewing areas. • Special measures will be provided for intensive slash cleanup on or adjacent to occupancy sites or developments • The above requirements favor logging systems that have a minimum effect on the natural appearing forest as viewed by the traveler along the river or from a vista area. Utilizing helicopter, skyline, and horse logging.	remove any trace of the slash piles within the corridor. See Soils Report. See above. No roads or skid trails would be located within the WSR corridor in Alternatives 3 and 4. Two short temporary road segments would be proposed in Alternative 2 along ridges not seen from the river. Design criteria require intensive clean up and rehabilitation of landings located at Two Shadows, Wild Goose and Johnson Bar in Alternatives 2 and 3; slash would be hauled to disposal sites. Alternatives 2 and 3 would harvest approximately 143 - 168 acres within the WSR corridor. Approximately 50% of the acres would utilize helicopter logging methods and about 50% would utilize skyline logging methods. There would be no tractor logging within the WSR corridor. Alternative 4 would have no harvest proposed within the Wild and Scenic River boundary.
Timber 5	Reforestation or other planting in the absence of natural revegetation shall be carried out where necessary to restore landscape appeal and protect watershed values.	See Silviculture Report. See Scenery Management Report. One of the objectives of harvest is to accelerate the rate of tree recovery over natural processes (no action). Alternative 2 and 3 would harvest then plant, jump starting tree recovery. Natural processes would dictate stand recovery in Alternative 4 within the Wild and Scenic River boundary. There would be harvest and replanting in areas that border the WSR in Alternative 4. The planting of larch would provide visual color diversity in the fall, which would be very limited if the area is not planting under Alternative 1, due to the lack of a larch seed source in the area.
Timber 6	Timber stand shall be kept as healthy as possible both to protect the zone and to protect adjoining lands.	See Silviculture Report. Insect and disease processes are evident in the project area and throughout the WSR corridor. Alternatives 2, 3, and 4 would provide for removal of insect infested trees and provide for reforestation of tree species more resilient to insect and disease infestations.

Standard Number	Subject Summary	Evaluation of Compliance
Timber 7	Require timely erosion prevention measures wherever timber is cut. Funds to minimize erosion will be provide for all timber sales and in the amount needed for maximum control.	See Soils Report. See Hydrology Report. Design Criteria for the project would assure implementation of Best Management Practices to minimize erosion.
Water 3	It will be necessary to restore areas where watershed deterioration is in evidence due to prior activities of man, flood conditions, domestic livestock, wildlife, fire or landslides. Interdisciplinary planning teams are to be utilized to plan these projects.	See Silviculture Report. See Scenery Management Report. One of the objectives of harvest is to accelerate the rate of tree recovery over natural processes (no action). Alternative 2, 3 would harvest, then plant jump starting tree recovery in the WSR corridor. In Alternative 4 these activities would occur in areas that border the WSR corridor, but not within it.
Water 8	Individual projects may require modifications to insure maintenance of desired water quality. Modifications will be made when it has been determined that such uses or activities cannot be made compatible with the river.	See Management Area 8.2, Wildlife and Fish Standard #1 above.
Wildlife and Fish 1	Provide for the perpetuation of the anadromous fishery in all project plans….	See Fisheries report. No adverse effects to the anadromous fishery is anticipated.
Soil 1	Special soils studies and evaluations will be required whenever attempting complex projects or developments within the River system boundaries.	See Soils report.
Soil 2	Revegetation projects, providing a protective soil cover crop, will be required for all applicable projects and following large fires.	Following the Johnson Bar fire mulching and seeding was considered with Burned Area Emergency Rehabilitation efforts but deemed unnecessary. This project has specific design criteria to retain fine and course woody debris within treatment areas rather than seeding with a cover crop. This woody debris would protect soils from erosion. See Hydrology Report.
Fire Control 6	Provide for the restoration of fire damage immediately after the fire is controlled. Include mulching and planting of fire lines and other erosion measures as necessary and appropriate within each river class.	See BAER report. Fire lines, drop points and roads used for fire suppression efforts were rehabilitated immediately following the fire. See Soil #2 above.
Management Guides Prescriptions (pg 44 – 54)		
Recreation 2	Project activities which create noise, dust, air pollution, etc., are to be restricted or otherwise controlled.	See Forest-wide Standards #1 above

Standard Number	Subject Summary	Evaluation of Compliance
	Special project constraints will be required during the recreation season.	
Timber 1	Timber management programs within the river boundaries are to be directed at the maintenance of an attractive forest environment. An attractive forest environment is defined as the associated external factors; flora, fauna and etc., which in total make the river system a pleasing experience to the visitor. It can include many vegetative types and open areas if in total these features add beauty to the landscape and protect its soils, waters, and wildlife.	See Silviculture Report. See Scenery Management Report. One of the objectives of harvest is to accelerate the rate of tree recovery over natural processes (no action). Alternative 2, 3 and 4 propose replanting areas after the harvest activities are complete to begin the reforestation process. This would occur within and bordering the WSR corridor in Alternatives 2 and 3 and bordering the corridor in Alternative 4.
Timber 2	Forest management on the river is to be directed at sustaining a balanced vegetative cover suited to environmental, aesthetic and wildlife purposes.	See Scenery Management Report. See Wildlife Report. See Silviculture Report.
Timber 3	Management emphasis on the river lands suited to timber production will not be on the reforestation of cutover or denuded tracts, but on sustaining a vegetative cover on the landscape.	See Management Guides – Prescriptions, Timber #1 above.
Timber 4	Selective cutting and shelterwood silvicultural methods will be used. …	See Silviculture Report. Design criteria for meeting visual quality objectives would result in silvicultural systems with variable retention levels however the goal would be to regenerate harvest areas through planting. Only dead and dying trees would be removed prior to replanting.
Timber 6b	Modify timber management practices …to meet or enhance aesthetic and recreational values. ….	See Forest-wide Standard #1 above.

3.8.3 Analysis Methodology

Effects to the Wild and Scenic River resources are based on effects to:

- Identified outstandingly remarkable values;
- Free flow;
- Consistency with the applicable River Plan, and
- Consistency with the Nez Perce Forest Plan.

This project does not propose any activities within the normal highwater of the Selway or Middle Fork Clearwater Rivers or their tributaries located within the designated boundaries of the Wild and Scenic River. Free flow would not be affected by this project and is not discussed in detail.

The identified ORVs for the Middle Fork Clearwater Wild and Scenic River are:

- Scenery
- Recreation
- Geology
- Fish
- Wildlife
- Historic and Cultural
- Water Quality
- Vegetation/Botany

All of the outstandingly remarkable values have been addressed in other resource reports except Geology. This project would not affect the underlying geology or any geologic features within the project area and therefore is not discussed in detail. This report summarizes the findings in context of Forest Plan and River Plan consistency.

3.8.4 Resource Indicators

Resource indicators have been identified for each resource area and are discussed and analyzed in detail in those resource reports and corresponding sections of this SEIS in Chapter 3. The resource indicator for the Wild and Scenic River as a whole is consistency with the River Plan and Forest Plan. There are no specific metrics to be evaluated, above those identified for each individual resource area.

3.8.5 Affected Environment

There are approximately 21,600 total acres within the designated boundaries of the Middle Fork Clearwater Wild and Scenic River. This land area is identified as Management Area 8.2 in the Nez Perce Forest Plan (III-19-21). A portion of the Middle Fork Clearwater Wild and Scenic River System is located within and adjacent to the project area. Approximately 2,100 acres of designated river corridor are located within the project area and another 2,000 acres are adjacent (Appendix A – Maps).

The existing condition of the individual Outstandingly Remarkable Values is contained within Chapter 3 for the specific resources listed below:

- Scenery is addressed in the Scenic Quality section and specialist report
- Recreation is address in the Recreation and Trails report
- Geology is not addressed
- Fish are addressed in the Fisheries section and specialist report
- Wildlife are addressed in the Wildlife section and specialist report
- Historic and Cultural are addressed in the Cultural Resources report
- Water Quality is addressed in the Fisheries, Hydrology, and Soils sections; and specialist reports
- Vegetation/Botany is addressed in the Forest Vegetation section, Fuels and Weeds/Botany reports

About 1,300 acres (60% of the acres within the designated boundaries) were burned with the Johnson Bar fire. Most (82%) of those acres were moderate to high severity. Fire burned down to the river on almost the entire length of the river within the project area. Fire effects primarily include burned and downed trees readily visible along the river-edge and throughout the river corridor and potential for increased erosion due to loss of organic matter.

3.8.6 Direct and Indirect Effects

The Environmental Consequences associated with the proposed activities on the individual Outstandingly Remarkable Values is summarized below and contained within the reports for those specific resources. Although summarized in this entire Wild and Scenic River section, a complete evaluation of the Johnson Bar Fire Salvage project is the project record. Each of those reports was referenced in the Affected Environment section above. This section will focus on Forest Plan and River Plan compliance as related to the proposed actions and effects described in the individual resource reports.

3.8.6.1 Outstanding Remarkable Values (ORVs)

The Environmental Impacts associated with the proposed activities on the individual Middle Fork Clearwater and Selway Rivers Wild and Scenic Outstandingly Remarkable Values is contained within the the resource sections of Chapter 3 and the specialist reports for those specific resources. Effects of the project activity on the ORVs are evaluated below. In alternative 4, the preferred alternative, no felling activities will take place in the Middle Fork Clearwater or Selway River Wild and Scenic Corridors. The corresponding specialist reports conclude that with the project design features identified, Forest Plan standards will be met and no adverse effects will occur that would diminish the identified ORVs. The Johnson Bar Salvage project will have no adverse effect on the conditions of free-flow or on the ORVs in the Middle Fork Clearwater or Selway Wild and Scenic Rivers.

Scenery

All action alternatives would create openings of varying sizes and shapes in areas that are highly visible, but were affected by the Johnson Bar fire of 2014. Design measures would be implemented so that openings created through harvest would emulate the natural openings created by previous fire events in the river corridor, such as those found in the Meadow Creek drainage. These openings will be visible, but will appear very similar to the openings in the river corridor that were created by natural fire processes in the past. Most of the areas affected by the fire will appear as openings eventually, whether they are harvested by man or not. Over time the natural regeneration process will introduce coniferous vegetation back to the canyon, but this process can take decades. This revegetation process would be accelerated in areas of harvest that are then replanted after harvest was completed (Scenic Quality section and specialist report).

Recreation

The action alternatives are consistent with the Wild and Scenic Rivers Act as they would have negligible effects on the Middle Fork Clearwater River. Recreation attractions and activities occurring on lands adjacent to the corridor would be protected through design features and BMP implementation as previously discussed; thus protecting and enhancing the outstandingly remarkable value of recreation (Recreation specialist report).

Fish

The action alternatives are consistent with the Wild and Scenic Rivers Act as they would have negligible effects on the Selway and Middle Fork Clearwater Rivers. The fisheries outstanding remarkable values would be protected through design features and BMP implementation as previously discussed. Road decommissioning and improvement activities would maintain the fisheries values throughout project area streams, both inside and outside of the designated Wild and Scenic River corridor (Fisheries section and specialist report).

Wildlife

The criteria for ORVs for wildlife include maintaining or improving populations and habitat for elk, mountain lion, black bear, bald eagle, harlequin ducks, Coeur d' Alene salamander, and river otter. The Woodrat Fire Salvage Project would comply with the above criteria in two manners: no harvest activities would occur within the corridor, and those activities adjacent to the corridor would either improve forage opportunities for elk, mountain lion and black bear, or would not affect habitat for the duck, salamander or otter (Wildlife section and specialist report).

Prehistory, History, and Traditional Use/Cultural Wildlife

The action alternatives are consistent with the Wild and Scenic Rivers Act and the Middle Fork of the Clearwater including the Lochsa & Selway Comprehensive River Management Plan as they would have negligible effects on the Middle Fork and Selway Rivers. There are no known prehistoric or historic sites located in any proposed harvest units within the Middle Fork Clearwater and Selway Wild and Scenic River associated with the action alternatives. In association with this project, The Nez Perce Tribe has provided no specific subsequent information about their traditional uses or use sites in the Middle Fork Clearwater and Selway Rivers. The ORVs for prehistory, history, traditional/cultural use will be protected (Cultural Resources specialist report).

Water Quality

The Selway River provides exceptionally clear and clean water, where the primary impacts to Water Quality are sedimentation resulting from natural events such as landslides and fire. No project activities that will directly alter within-channel conditions or existing hydrologic or biologic processes are proposed within the Wild and Scenic River corridor. There are no treatments proposed that will alter riparian or floodplain areas of the Selway River Wild and Scenic River. Both the location of proposed project activities and the design of implementation (Project Design Criteria and Best Management Practices) will limit sedimentation into Project Area streams and the low levels of sedimentation will not degrade water quality at the site-scale. Sedimentation into headwater tributaries at the site scale, will not impact water quality of the Selway River. The ORV for Water Quality will be maintained.

Vegetation/Botany

The Johnson Bar Fire of 2014 and Wash and Slide fires of 2015 burned portions of the Selway River and reset the successional stage. Nyland (2002) and Oliver and Larson (1996) state that following a major disturbance (i.e. stand replacing event), the successional stage of a stand reverts to a "stand initiation" or non-old growth stage (Nyland, 2002; Oliver and Larson, 1996). In all cover types, stands burned at high severities have returned to the stand initiation stage. This has led to a diversity in the vegetation within the viewing area of the wild and scenic river corridor. Proposed harvest within the viewing area would protect and enhance the Vegetation ORV by reducing fuels and increasing the resilience of the forest to fire and insects and disease by planting early seral species. Harvest is also consistent with the River Plan by providing for public safety. The presence of large stands of snags constitutes a safety hazard along roads and within stands.

State and private reforestation efforts within the corridor has provided 2-4 more years competitive advantage over natural seedlings (Hobbs et. al., 1992), which will shorten the fire recovery period. Forest Service reforestation efforts would reduce the fire recovery period as well and enhance wild and scenic rivers outstanding and remarkable values, by restoring tree cover quickly. This would protect and enhance ORVs by providing quick revegetation of the area. The retention of snags and unharvested areas would promote visual diversity. Removing excess dead trees would allow big game wildlife access and possible viewing from the corridor.

In 2016, the understory is dominated by fireweed and thimbleberry. Maidenhair fern, lady fern and other ferns will develop as shade conditions develop which remove thimbleberry and other competing vegetative species. Forest conditions developing from restored western white pine and western red cedar would eventually restore conditions needed for fern species (Forest Vegetation section and specialist report).

3.8.6.2 Effects Common to Alternatives 2 and 3

Alternative 2 would harvest 168 acres and Alternative 3 would harvest 143 acres within the Wild and Scenic River Corridor.

In Alternative 2 approximately 65 acres of the harvest would be helicopter logged in units 102, 103, 104, 126, 143, and 145 B, C, D & F and 103 acres would be skyline logged in units 103 and 104. Harvest units 103 and 104 account for over 80% of the harvest activity within the Wild and Scenic River boundary.

In Alternative 3 approximately 97 acres of the harvest would be helicopter logged in units 102, 103, 126, 143, and 145 B, C, D & F and 46 acres would be skyline logged in units 103 and 104.Unit 103 is located along the ridge west of the Lochsa/Selway River confluence at Lowell. Unit 103 is readily visible from US Highway 12 and the businesses and residents of Lowell. Unit 104 is located on Swiftwater Ridge, with a portion of the unit positioned on the slope facing the Selway River and Road 223 and will be readily visible as well the other units located within the Wild and Scenic River corridor are ridge top fingers that would be difficult to see from the Middle Fork Clearwater or Selway Rivers, Highway 12 or Road 223. Alternative 2 would utilize more skyline logging harvest methods and design criteria would be applied to harvest activities to meet Visual Quality Objectives as described in the Scenery Resources report.

Harvest in these areas would reduce the number of standing dead trees and would replant those areas with fire tolerate species (see Silviculture Report) which would accelerate the stand regeneration process compared to natural processes.

Alternatives 2 and 3 would utilize Helicopter Landings H1 and H6 located at the Wild Goose Campground and Johnson Bar Campground respectively and H18 located Two Shadows, all located within the Wild and Scenic River corridor. Use of these landings would affect river residents and Forest visitors as described in the Recreation and Trails Report. Alternatives 2 and 3 would utilize log haul routes within the Wild and Scenic River corridor including the Selway River Road 223, US Highway 12, the Swiftwater Road 470 and O’Hara Creek Road 651. Use of these roads would affect river residents and Forest visitors as described in the Recreation and Trails Report.

3.8.6.3 Alternative 4

Alternative 4 would not harvest or utilize helicopter landings within the designated Wild and Scenic River Corridor. Alternatives 4 would utilize log haul routes within the Wild and Scenic River corridor including the Selway River Road 223, US Highway 12, the Swiftwater Road 470 and O’Hara Creek Road 651. Use of these roads would be less than Alternative 2 and 3 due to the reduction in total volume being removed from the project area. The effects would be similar to Alternatives 2 and 3 but slightly less. The effects on river residents and Forest visitors are described in the Recreation and Trails Report.

3.8.7 Cumulative Effects

Very few of the Past, Present and Reasonably Foreseeable Future Projects have occurred in the designated Wild and Scenic River Corridor. Ongoing road and trail maintenance, the presence and operation of campgrounds and administrative sites all occur within the corridor. Other projects that have occurred within the corridor and adjacent to the project area include Bridge Creek Timber Sale (2009), Interface Fuels Timber Sale (2012), and the transport of oversized loads on US Highway 12. Bridge Creek and Interface Fuels projects conducted timber harvest and used Wild Goose and Two Shadows helicopter landings. Both projects implemented design criteria to protect river resources, and did so successfully. Future projects with potential activities within the corridor include Woodrat Salvage Sale, Roadside, Recreation and Hazard Tree Removal, Lowell WUI, Fenn Face and North Selway Face. These future projects also include design criteria for protecting river resources.

Timber harvest activities within the Wild and Scenic River Corridor have been minimal, with man-made activities focused on reducing insect and disease processes and improving wildfire resiliency as outlined in the Middle Fork Clearwater Management Guidelines. Vegetation treatments have been completed on less than 1% of the total river corridor acres in the past decade. Decreased forest health and increased insect and disease activity are evident and may warrant future management actions. There have also been some short term activities that have occurred in the corridor, such as use of helicopter landings and transport of oversized loads on U.S. Highway 12, that are evident but these have been minimal and of short duration. Coordination with private landowners and Department of Transportation are ongoing on all changes proposed along the highway corridor and on private land covered by scenic easements. These efforts have resulted in minimal aesthetic changes over the last twenty years within the corridor.

3.9 Economics

3.9.1 Analysis Area

The Johnson Bar Fire Salvage project area is located within Idaho County, Idaho. The economic analysis area includes local towns and communities influenced by the timber sale activities. These towns include Grangeville, Kamiah, Kooskia, Orofino, Pierce, Weippe, and Lewiston, Idaho, plus many small towns in between. The influence is based on their geographic location to the watershed, economic dependence on it, and use of it, dating back to settlement of the area more than 100 years ago. The Nez Perce and Clearwater National Forests have provided wood to local mills since the 1930s. The Forests' output, along with Bureau of Land Management (BLM) timber outputs, accounted for half of the total timber harvested in Idaho County during the mid-1990s. Most of it was processed in mills located in or near the towns mentioned previously. In 2015, the analysis area included six major sawmills, two of which closed in 2016 citing lack of available timber; one in Kamiah and one in Orofino.

3.9.2 Regulatory Framework

The proposed Johnson Bar Fire Salvage project would comply with the Nez Perce National Forest Plan (Forest Plan) direction to develop cost effective projects and with the National Forest Management Act (NFMA) by emphasizing resource management over timber volume output.

3.9.2.1 National Forest Management Act

The NFMA requires that a sale "consider the economic stability of communities whose economies are dependent on such national forest materials, or achieve such other objectives as the Secretary deems necessary" (NFMA Section14, e,1,c) and "the harvesting system to be used is not selected primarily because it would give the greatest dollar return or the greatest unit output of timber" (NFMA, Section 6, g,3,E,IV). The proposed project would meet the requirements of the NFMA by considering the economic community stability through the IMPLAN model evaluation of the alternatives. Also, the harvest systems are based upon ground-truthed silvicultural practices to achieve the desired long-term forest and access needs, and not on the highest dollar return.

3.9.2.2 Nez Perce National Forest Plan

Forest Plan Goal A.1, page II-1: "Provide a sustained yield of resource outputs at a level that would help support the economic structure of local communities and provide for regional and national needs". The proposed action alternatives would help meet Forest Plan goals.

3.9.2.3 Forest Service Manual

The Forest Service Manual directs that economic feasibility be considered in project design, during the early planning stages and NEPA documentation. A sale feasibility analysis was completed at Gate 1, which led to consideration of economic adjustments to the alternatives in order to reflect ways in which to lower costs, such as reducing the amount of helicopter logging and high cost development of landing areas. It also highlighted the potential need for funding to cover reforestation needs caused by the Johnson Bar fire. Since the fire caused the need for reforestation of the land, removal of the dead trees is not required in order to cover the cost of reforesting the ground. However, by removing some of the fire killed trees, there would be an opportunity to generate funds to contribute to the cost of reforesting the areas.

3.9.2.4 Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Although not a direct economic requirement, Executive Order 12898 requires that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories.

The Johnson Bar analysis did not reveal any disproportionately high or adverse effects to minority and low-income populations. None of the action alternatives are expected to negatively affect the consumers, civil rights, minority groups, Native Americans, women, or any United States citizen. No environmental health hazards are expected to result from implementation of any alternative. This project would not disproportionately affect income level.

3.9.3 Resource Indicators

3.9.3.1 Timber Harvest Related Jobs and Income

Jobs and income generated from the proposed project would contribute to community stability. The Nez Perce National Forest Plan Final Environmental Impact Statement (FEIS), pages IV-26 and 27, describes the economic effects of implementing the Forest Plan (Forest Plan, USDA-FS 1987a and 1987 as amended). The Forest Plan addresses the economic analysis process and values placed on non-consumptive items, such as recreation opportunities, community stability, cultural resources, habitats, and populations (Forest Plan, Appendix B, pages 51-142). This economic analysis would not revisit the information presented in the Forest Plan and would focus only on those costs and revenues associated with implementing the proposed activities in the project area.

The University of Idaho Forest Products Department and the Bureau of Business and Economic Research at the University of Montana produce annual Economic Outlook Reports for the forest products industry in Idaho and Montana (Cook et al. 2015). Utilizing economic data from the IMPLAN model and the Forest Industries Data Collection System (FIDACS), these reports provide statistics that articulate the economic value of timber harvest projects to derive the indirect and induced economic effects. In Table 41, the number of forest product industry (FPI) jobs supported; the amount of wages and salaries generated; and the quantity of goods and services sold per million board feet of timber harvested, is displayed.

Table 41. Economic results per million board feet (MMBF) of timber harvested

Forest Product Industry Jobs Sustained	18 jobs per 1.0 MMBF
Revenue to Communities through Wages and Salaries	$528,000 per 1.0 MMBF
Revenue to Communities through Sale of Goods and Services	$3,200,000 per 1.0 MMBF

3.9.3.2 Sale Feasibility

The Region One Gate 1 and 2 spreadsheet and the Quicksilver model, with the Nez Perce-Clearwater National Forest area factors, were used to determine sale feasibility and appraised value. The Quicksilver model uses recent transactional evidence based on local timber sales to determine sale value. The timber stand data base and extensive field reviews were used to determine timber volume and species composition; these are the two primary factors determining gross value of a timber sale. Net value depends on costs for the logging system, haul distance, slash disposal, planting, and cost of mitigation activities. The cost estimates for this sale are based on recent similar sales in the vicinity. Although the reforestation costs are displayed in this analysis, they are not required to be covered by the timber harvest value because the need to reforest was not caused by the harvest, instead the need to reforest was caused by the fire. This means that a low value sale could be advertised for sale while relying on supplemental funding to cover the reforestation costs.

3.9.4 Affected Environment

The towns of Grangeville, Orofino, Weippe, Pierce, and Lewiston all show high to very high historic employment in the wood products manufacturing industry.

As of August 2016, Idaho County had an unemployment rate of 5.7%, Lewis County 7.7%, and Clearwater County 6.9%. The increase in unemployment in Lewis County from 3.2% in 2015 to 7.7% in 2016 reflects the recent mill closure in Kamiah. The Idaho State average unemployment rate is 3.8% and the National average is 4.9%.

Counties dependent on Federal timber receipts as Payments in Lieu of Taxes (PILT) to help fund schools and roads have found that this source of funding has declined due to lower National Forest timber outputs, so they have relied more heavily on taxes to bolster their income. The PILT distribution process was revised under the Secure Rural School and Community Self-Determination Act of 2000, P.L.106-393 (SRS). This revision allowed counties to select “full payment” of the high three years of National Forest Receipts, rather than rely on yearly timber sales or National Forest funds. Currently SRS has not been approved, which means Counties would resort back to the PILT process.

Idaho has been a natural resource-based state since the 1800s, although as natural resource extraction declines, there is some movement toward diversification. Many communities have made impressive strides in achieving Idaho Gem Community status and are working towards diversifying their economies. (The Gem Community program was established by the Idaho Department of Commerce to encourage communities to plan their futures). As reported by the Idaho Department of Labor, the timber products industry went through hard times in the early 1980s, but those firms which survived were streamlined and modernized with the hope of having a consistent supply of timber from National Forest administered lands.

Two saw mills in the Clearwater basin, one in Kamiah and the other in Orofino, closed in 2016. Both mills attributed lack of sufficient timber supply as contributing to their closure.

3.9.5 Direct and Indirect Effects

3.9.5.1 Alternatives 2, 3, and 4

Community Income and Employment

Employment and income effects attributable to Forest Service timber management are derived from the harvesting and processing of timber. Timber harvesting and processing requires the employment of loggers, truck drivers, mill workers, and a variety of workers in logistical support. In addition, if a project is not cost effective, it would not sell, which then would cause it to not contribute towards the Forest’s timber output and community stability.

Logging contractors, wood processing plants, county road departments, and public schools must purchase materials and labor to perform their functions. These purchases produce indirect effects. Induced effects are the result of spending by workers directly employed in the timber industry and by workers that are in part supported by dollars generated by the timber industry, such as grocery and equipment stores. This chain of purchases travels through the local community until the timber dollars leave the local market area and become part of the national economy.

Table 42 displays the Job and Income effects as a result of implementing the action alternatives. The numbers do not reflect additional jobs and income related to the implementation of the non-timber harvest road decommissioning. Road decommissioning would generate some additional jobs and income, but not to the same level as timber harvest, and would not point to any action alternative as generating more than the other because the decommissioning is the same for all action alternatives.

Alternative 1 would not sustain any timber harvest jobs. Alternative 2 would generate the most jobs and revenue, because it generates the most timber volume. Alternatives 3 and 4 would be behind Alternative 2 based upon volume harvested.

Table 42. Timber harvest Jobs and Income under each alternative

Alternative	VOLUME (MMBF)	Jobs Sustained (FTE)	Labor Income	Goods and Services Income
2	31,000	558	$16,369,000	$99,203,000
3	24,900	448	$13,410,000	$79,637,000
4	19,400	349	$10,240,000	$62,063,000

Each alternative would produce a different level of benefits and costs associated with the timber harvest, road work, fuel treatment, reforestation, mitigation measures, design criteria (skid trail decompaction), and other related timber harvest activities. This part of the economic analysis focuses on the relative differences in these benefits and the associated costs between alternatives by displaying Predicted Bid Rates and Present Net Value (PNV) and is summarized in Table 43. The Predicted Bid Rate is the dollar amount, based on recent bidding that the Nez Perce National Forest anticipates the timber would sell for. The PNV is the anticipated selling value minus the costs of implementing the sale. An alternative having a positive PNV would have stumpage values exceeding costs, where-as an alternative with a negative PNV would have costs in excess of stumpage values and may require supplemental funding in order to complete all of the activities. A sale with a negative appraised value may not sell.

Information provided by the economic models is used as a tool to understand the relative monetary differences between alternatives rather than to predict actual values for each alternative, since the variables may change between now and the time the timber sells.

All action alternatives have loss value since the fire due to volume reductions caused by fire damage and the subsequent deterioration. Volume estimates immediately following the fire were between 47 and 82 MMBF, depending upon the alternative. Delays in timber harvest have reduced the volume by 38% to 40%, resulting in a timber stumpage value loss to date of $4,200,000 to $10,000,000. The resulting lower volume per acre also has a drastic effect on logging costs for the remaining timber, which is depicted in Table 42 by the low appraised stumpage values.

Alternative 4 is the only alternative with a positive appraisal value. Alternatives 2 and 3 appraise with deficit; and therefore, would not generate any funding to help cover reforestation or other costs but would support more jobs than Alternative 4. The reforestation and road decommissioning proposed could be covered using supplemental funding; however, it is being depicted in Table 43 to reflect costs associated with the project.

Alternative 4 is feasible and would be sellable. Supplemental funding would likely be needed to cover some of the reforestation costs incurred under Alternative 4, and definitely be needed for alternatives 2 and 3.

Alternative 3, as presented, would likely not be feasible or sellable. Alternative 3 would use more helicopter logging than the other alternatives to reflect the minimal soils disturbance alternative of not constructing temporary roads in the Selway Subbasin. In many cases, such as Units 115, 122, 125, 129, and others, this would necessitate the use of a helicopter to access the harvest units on the backside of a ridge where a short temporary road is proposed under the other action alternatives in order to allow less expensive skyline logging systems to be used. Alternative 3 would need to eliminate approximately 750 acres of helicopter yarding ground to make it a feasible alternative.

Although Alternative 4 would not generate the highest volume of output, it is the most economically feasible alternative and would generate the most revenue, primarily because it would include fewer helicopter treatments, which incur the greatest costs.

All of the action alternatives would be highly susceptible to market value changes caused by deterioration of the trees, to the point that if the recovery of the trees is delayed too long there would be no economic value remaining, except for some of the cedar as a low value cedar product. Some trees near Hot Point burned so hot that they do not currently have any timber value and would be left in place for other resource benefits. The majority of the fire area proposed for harvesting burned with a hot ground fire that killed the tree roots, which left the tree with needs but without a nutrient root source to sustain the tree. Some trees still appear green; however, many have already begun to or completely lost their needles while others will progressively turn brown and check and/or sap rot.

None of the action alternatives would generate enough funds to cover the $291,000 NEPA analysis costs; however, the pre-decisional NEPA costs are not an outcome of the NEPA decision and therefore are not included in the economic analysis. They are shown to display the investment made to complete the NEPA process.

Alternatives 2, 3, and 4 differ in costs due to the amount of harvest area being treated. The differences in the area being treated were influenced by the amount of temporary roads planned by the alternatives. The temporary roads planned under Alternatives 2 and 4 would not only provide access to more area, but would also reduce skidding costs by shortening the skidding distances and allowing the use of less expensive yarding systems.

Helicopter logging is the Forest's most expensive log removal method available, and for this project it would have the greatest effect on an alternative's feasibility. Alternative 4 would have the least amount of helicopter logging (35% would be helicopter logged), which would result in the highest sale value. Alternative 3 would reduce the amount of soil disturbance by not building roads or landings and minimizing tractor logging. This would result in Alternative 3 using more helicopter logging (77% would be helicopter logged), and consequently result in the lowest sale value. Alternative 3 would also use skyline logging in areas proposed for tractor logging under Alternatives 2 and 4. A direct bearing on helicopter costs is the amount of time it would take (a factor of distance and time to hook logs to the helicopter longline) to fly from the log pick-up point to the landing where it would drop them off; the longer the flight distance, the higher the cost. For the value of the project area timber, the goal was to provide a helicopter landing within an average of 3,000 feet of the harvest area center and with a maximum flight distance of 1 mile to the back of the unit. All action alternatives exceed this target distance with an average of 3,800 feet, 3,600 feet and 3,400 feet respectively.

Another key factor in helicopter logging costs is the size of the logs being hauled, which equates into the amount of time it would take to hook a full payload onto the helicopter; small logs generally take longer to get a full helicopter payload. The tree's top logs would constitute the small logs for this project. In light of the fact that small tree tops would cause higher logging costs, and that the small tops would have less value due to deterioration, plus the need to retain coarse woody debris on site, a design criteria that allows a variable top diameter would enhance the sale feasibility of all of the alternatives, if other resource objectives, such as fuel loadings, could be met.

In addition, reforestation costs would be high for all of the action alternatives (Table 43). In order to reduce the effects of reforestation costs, natural regeneration could be implemented in areas with suitable seed trees, which would meet the project purpose and need. Supplemental funding is being requested for reforestation because the need to reforest was the result of a natural event. However, any excess funding generated from the timber stumpage would be used to help offset any reforestation costs.

Table 43. Predicted stumpage and present net value under each alternative

Alt.	Volume CCF	Volume MBF	Appraised Total Value[a]	Reforestation[b]	Implementation[c]	Present Net Value	Road Decommi-ssioning[d]
2	52,300	31,000	-($1,831,000)	$1,757,000	$176,000	-($3,764,000)	$150,400
3	42,000	24,900	-($2,798,000)	$1,370,000	$168,600	-($4,337,000)	$150,400
4	32,700	19,400	$499,000	$1,188,000	$159,000	-($848,000)	$150,400

[a] Appraised value predicted high bid includes skid trail decompaction and road costs associated with the harvest.
[b] Reforestation costs include planting costs with overhead.
[c] Implementation costs include presale, engineering and administration costs. NEPA costs, which total about $120,000, are not included in this cost total.
[d] Road decommissioning consists of unneeded roads that are not used for the timber harvest. Unneeded roads used for the harvest would be decommissioned as part of the sale and are included in the appraisal costs.

3.9.6 Cumulative Effects

The cumulative effects area of analysis is Clearwater, Idaho, Lewis, and Nez Perce counties in Idaho. The timber sale logging contract would last approximately 3 years in order to complete the timber harvest and road decommissioning and is anticipated to begin in 2017. Wild and Scenic ORVs that that are responsive to tree cover, such as water quality, wildlife and scenic resources, would be supported by the economic value of the timber that would be used to pay for reforesting the burnt areas. Post-harvest reforestation, consisting of hand planting, would continue for up to 3 years following the timber harvest, for a total of up to 6 years of activities (some planting would likely overlap with the logging years, thus reducing the total activity period). Operations would continue year-round unless specific conditions of resource damage or consequences are defined. Harvest operations are expected to last 3-4 years, preparation of sites for tree planting would occur 2-3 years post-harvest, and planting would occur during the growing season after any prescribed fires.

Economic effects of the harvesting activities would be due to the additional jobs, taxes, and income they provide throughout the counties. When considering effects of additional jobs and income, this sale would contribute towards the Forest's 5-year timber sale plan, but not beyond the level of current employment. The Nez Perce-Clearwater National Forest 5-year timber sale plan is currently projected to be about 60 MMBF per year. Sold or foreseeable local sales affecting the same communities and contributing to the long-term timber flow of these communities include Swede, Preacher Dewey, Lochsa Thin, Clear Creek, Lowell WUI, Lolo Insect and Disease, and the 2015 fire salvage sales (Woodrat, Snowy Pete and Wash). The State of Idaho is completing its harvest of approximately 60 MMBF as a result of the 2015 wildfires. Some of the private lands burned in the fire were harvested during the winter of 2014/2015.

The Forest plans to harvest trees as a result of the 2015 wildfires over the next two years for a total of approximately 10 MMBF. All of the State and private burned areas are located west and north of the project area; whereas, the Forest Service areas are located north and south of the project area.

Current mill delivered log values have declined for some of the burned timber due to higher mill costs associated with handling and sorting of the charred wood. The influx of lover value burned timber could affect timber prices; however, current market conditions in the Clearwater Basin remain high, which was reflected in recent bidding on State and Forest Service salvage sales.

To avoid flooding the market with timber, the mills switched from green timber to fire salvaged trees from Forest Service, State, and private lands in an effort to use deteriorating fire killed trees before they lose value and save the green volume in order to sustain the timber supply once the dead volume has been processed (personal communication with G. Danly, Empire Lumber Co., 2016). In October 2016 the TriPro Mill in Orofino, which employed approximately 50 people, closed, citing a lack of trees being sold for harvest and the Johnson Bar litigation, which eliminated available logs they had under contract to purchase (Lewiston Tribune, 10/6/2015).

3.9.6.1 Alternatives 2, 3, and 4

Added to the Forest 5-year timber sale plan, the action alternatives would contribute to jobs and income. However, these alternatives are not expected to generate an excessive amount of jobs or income from timber harvest or road work to cumulatively effect the local communities beyond the past three year employment averages, because the mills would adjust their timber harvest to match their production goals. This could mean that some “green wood” sales would be delayed in being harvested, so the purchaser can harvest the higher priority dead Johnson Bar timber before it loses merchantability.

The loss of the Blue North and TriPro mills could cause a change in timber stumpage values within the Clearwater market area, because of reduced competition. However, the area capacity is expected to be absorbed by the other mills as they strive to meet their full production potential (personal conversation with G.Danly; Empire Lumber and B.Higgins; IFG 2016). There will not be an excess of timber that no one would purchase due to the mill closures. In fact one reason cited for both mill closures was lack of continuous timber to support all of the mills in the market area (Lewiston Tribune 5/5/2016 and 10/6/2016). There would not be a noticeable change in area jobs due to the mill closure either, because the number of jobs associated with the timber harvest and processing is connected to the amount of volume processed. Since all the loggers and mills are using the same methods and technology to complete the work, more workers may be needed at the remaining mills.

3.9.7 Irreversible and Irretrievable Commitment of Resources

None known or suspected. From an economic standpoint, harvest and utilization of the merchantable timber at this time is the lowest risk to loss of economic value. Continued deterioration, fire, insects, disease, and other natural events could reduce the existing monetary value of the trees in the analysis area. Since the 2014 fire, a direct stumpage value loss exceeding $4,200,000 has occurred within the proposed harvest units.

3.9.8 Adverse Effects Which Cannot Be Avoided

None known or suspected.

3.10 Short-Term Uses and Long-Term Productivity

The National Environmental Policy Act (NEPA) requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Short-term uses are those that generally occur annually. Long-term productivity refers to the ability of the land to produce a continuous supply of a resource. The Johnson Bar Fire Salvage project would result in short-term impacts, but maintain the long-term productivity of the area through the use of specific Nez Perce Forest Plan standards and guidelines, design measures built into the project's design, and project design criteria. A description of impacts expected by alternative can be found by resource area in the above discussions. The project would result in a long-term yield of forest stands by reducing competition and improving growth of individual trees. The project would also result in an economic return from wood products produced and jobs created.

3.11 Unavoidable Adverse Effects

No unavoidable adverse effects over and above those addressed in the Nez Perce Forest Plan Final Environmental Impact Statement (Chapter 4, pages IV-89) have been identified.

3.12 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line right-of-way or road.

The action alternatives are not expected to create any impacts that would cause irreversible damage to soil productivity. The development and use of temporary roads and logging facilities is considered an irretrievable loss of soil productivity until their functions have been served and disturbed sites are returned back to a productive capacity.

Chapter 4. Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and other organization and individuals during the development of this environmental impact statement:

4.1 Interdisciplinary Team Members

Table 44.Johnson Bar Fire Salvage project Interdisciplinary team members

Resource	Name
Silviculture	Wes Case
Fire, Fuels, Air Quality	Doug Graves
Wildlife	Glen Gill
Fisheries	Karen Smith
Hydrology	Rebecca Lloyd
Soils	Rebecca Lloyd
Logging Systems	Tam White
Unroaded Areas	Mike Ward
Archeology	Cindy Schacher
Rare Plats, Non-Native Invasive Plants	John Warofka
Wild and Scenic Rivers	Carol Hennessee
Recreation	Kearstin Edwards
Visuals	Diana Jones
Natural Resource Planner	Sara Daugherty
GIS and Data Services	Margaret Kirkeminde

4.2 Consultation and Coordination

The Forest Service has continued consulted and coordinated with the following individuals, Federal, State, and local agencies, Tribes, and non-Forest Service persons during the development of this draft Supplemental Environmental Impact Statement.

4.2.1 Federal, State, and Local Agencies

Board of Idaho County Commissioners

Department of Interior

Environmental Protection Agency

Idaho Department of Environmental Quality

Idaho Department of Fish and Game

Idaho Department of Lands

Idaho Department of Parks and Recreation

Idaho State Historic Preservation Office

National Marine Fisheries Service

National Oceanic and Atmospheric Administration

U.S. Fish and Wildlife Service

4.2.2 Tribes

Nez Perce Tribe

4.2.3 Individuals, Entities, and Organizations

Richard Artely

Mark Giese

Lynn Haagenen

Harry Jageman

Jean Public

Jeff Juel

Marty Smith

George Wuerthner

Idaho Forest Group

Clearwater Basin Collaborative

Friends of the Clearwater

Idaho Conservation League

Idaho Rivers United

Glossary and Acronyms

A

Activity	A measure, course of action, or treatment that is undertaken to directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives.
Affected Environment	The biological and physical environment that will or may be changed by actions proposed and the relationship of people to the environment.
AIRFA	American Indian Religious Freedom Act of 1978
Alternative	One of several policies, plans, or projects proposed for decision making.
Anadromous Fish	Fish that spend much of their adult life in the ocean, returning to inland waters to spawn; e.g. salmon, steelhead.
Aquatic Ecosystem	A stream channel, lake, or estuary bed, the water itself, and the biotic communities that occur therein.
ATV	All-terrain vehicle. A type of off-highway vehicle that travels on three or more low-pressure tires; has handle-bar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator.

B

Basal Area	The cross-sectional area of all stems in a stand measured at breast height and expressed in terms of square feet ($feet^2$).
Best Management Practices, BMPs	The set of standards in the Forest Plan which, when applied during implementation of a project, ensures that water related beneficial uses are protected and that State water quality standards are met. BMPs can take several forms. Some are defined by State regulation or memoranda of understanding between the Forest Service and the State. Others are defined by the Forest interdisciplinary planning team for application Forest-wide. Both of these types of BMPs are included in the Forest Plan as forest-wide standards. A third type is identified by the interdisciplinary team for application to specific management areas. A fourth type, project level BMPs, is based on site specific evaluation, and represents the most effective and practicable means of accomplishing the water quality and other goals of the specific evaluation, and represents the most effective and practicable means of accomplishing the water quality and other goals of the specific area involved in the project. These project level BMPs can either supplement or replace the Forest Plan standards for specific projects.
Big Game	Those species of large mammals normally managed as a sport hunting resource.

Big Game Summer Range	Land used by big game during the summer months.
Big Game Winter Range	The area available to and used by big game through the winter season.
Biological Assessment	An assessment required by the Endangered Species Act of 1973 to identify any threatened, endangered, or sensitive species, which are likely to be affected by a proposed management action, and to evaluate the potential effects of the proposed actions on those species and their habitats.
Biological Opinion	A document issued by the US Fish and Wildlife Service or the National Oceanic and Atmospheric Administration fisheries after formal Section 7 consultation has occurred in accordance with the Endangered Species Act, which states the opinion of the US Fish and Wildlife Service or the National Oceanic and Atmospheric Administration fisheries as to whether a Federal action is likely to jeopardize the continued existence of a Threatened or Endangered species or result in the destruction or adverse modification of the species' critical habitat.
Biological Potential	The maximum possible output of a given resource, limited only by its inherent physical and biological characteristics.
BLM	Bureau of Land Management
BO/BiOp	Biological Opinion
Browse	Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game animals for food.

C

Capability	The potential of an area of land and/or water to produce resources, supply goods and services, and allow resource uses under a specified set of management practices and at a given level of management intensity.
Cavity	A hollow in a tree, which is used by birds or mammals for roosting and reproduction.
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Channel Morphology	The study of the channel pattern and geometry at several points along a river channel, including the network of tributaries within the drainage basin; also known as fluviomorphology or stream morphology.
Channel Type	A system developed by hydrologist Dave Rogen to classify and characterize similar stream channels. Water surface gradient and substrate particle size are the primary stream features used. Other features include bankfull width, width to depth ratio, entrenchment ratio, and floodprone width.

Clearcut with Leave Trees	Even-aged regeneration or harvest method that removes most of the trees in a stand, producing an exposed microclimate for the development of a new age class in one entry. A minor (less than 10% of full stocking) live component may be retained for reasons other than regeneration.
Closed Roads	Roads developed and operated for limited use. Public vehicular traffic is restricted except when they are operating under a permit or contract, or in an emergency situation.
Closure	The administrative order that does not allow specified uses in designated areas or on Forest development roads or trails.
Commodities	Resources with commercial value; all resource products which are articles of commerce, such as timber, range, forage, and minerals.
Council on Environmental Quality	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.
Cover	Vegetation used by wildlife for protections from predators, or to protect themselves from weather conditions, or in which to reproduce.
Critical Habitat	Specific areas within the geographic area occupied by a species on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection. Critical habitat does not include the entire geographic area which may be occupied by a Threatened or Endangered species.
Cultural Resources	The physical remains of human activities, such as artifacts, ruins, burial mounds, petroglyphs, etc., and the conceptual content or context, such as a setting for legendary, historic, or prehistoric events as a sacred area of native peoples, etc., of an area.
Cumulative Effects	The effects on the environment, which result from the incremental effect of a management action when added to other actions, whether they be on Federal, State, or private lands. Cumulative effects can be individually minor be collectively significant that take place over a period of time.
CWA	Clean Water Act

D

DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
Desired Future Condition	A desired condition of the land or a resource to be achieved sometime in the future.
Detrimental Soil Disturbance	Compaction, displacement erosion, loss of organic matter, and decreased soil productivity

Developed Recreation	Recreation that occurs where improvements enhance recreational opportunities and accommodate intensive recreational activities in a defined area.
Direct Effects	Effects on the environment or a resource which occur at the same time and place as the initial cause or action.
Dispersed Recreation	The portion of outdoor recreation use which occurs outside of developed sites in the unroaded and roaded Forest environment; i.e., hunting backpacking, berry picking, etc.
Disturbance	Any management activity that has the potential to accelerate erosion or mass movement; also any other activity that may tend to disrupt the normal movement or habits of a particular species. At the landscape scale, a disturbance would be a force, such as wildfires, disease, or large scale vegetation management, which can significantly alter existing ecosystem conditions.
Diversity	The distribution and abundance of different plant and animal communities and species within an area.
Draft Environmental Affect Statement	A detailed written statement as required by Section 102(2)(C) of National Environmental Policy Act.
DSD	Detrimental Soil Disturbance

E

EA	Environmental Assessment
EAU	Elk Analysis Unit
Economic Efficiency	The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit cost ratios and rates of return may sometimes be appropriate.
Ecosystem	A complete, interacting system of organisms considered together with their environment; for example a marsh, watershed, or lake.
Effects	Physical biological, social, or economic results (expected or experienced) resulting from natural events or management actions. Effects (effects/consequences) can be direct, indirect, and/or cumulative.
EHE	Elk Habitat Effectiveness
EIS	Environmental Impact Statement
Endemic	Term applied to populations of potentially injurious plants, animals, or viruses that are at their normal, balanced level in an ecosystem in contrast to epidemic levels. Plant and animal diseases which are prevalent in or peculiar to a certain locality.
Elk Hiding Cover	Vegetation, primarily trees, capable of hiding 90% of an elk seen from a distance of 200 feet or less

Elk Security Area	An area elk retreat to for safety when there is a disturbance in their normal range is being intensified, such as by logging activities or during the hunting season. To qualify as a security area, there must be at least 250 contiguous acres that are more than ½ mile from open roads.
Endangered Species	Any species which is in danger of extinction throughout all or a significant portion of its range, and listed as such by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.
Endangered Species Act	The Act was enacted in 1973 to protect animal and plant species from extinction by preserving the ecosystems in which they survive and by providing programs for their conservation. The Endangered Species Act is administered by two agencies: The National Marine Fisheries Services, which designates marine fish and certain marine mammals, and the US Fish and Wildlife Service, which has jurisdiction over all other wildlife.
Environment	The aggregate of physical, biological, economic, and social factors affecting organisms in an area
Environmental Analysis	An analysis of alternative actions and their predictable short- and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions.
Environmental Assessment	A concise public document for which a Federal Agency is responsible that serves to: (1) briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Affect Statement of a Finding of No Significant Affect; (2) aid an agency's compliance with the National Environmental Policy Act when no Environmental Impact Statement is necessary; and (3) facilitate preparation of an Environmental Impact Statement when one is necessary.
Environmental Affect Statement	A public document for which a Federal Agency is responsible that serves to: (1) provide sufficient evidence and analysis for determining the effects of an action on resources; (2) aid an agency's compliance with the National Policy Act; and (3) promote informed decision making by the Federal Agency.
EO	Executive Order
Ephemeral	A depression in the topography that carries surface water for brief periods of time either during or after peak rainfall events, but are normally dry throughout the majority of the year.
Epidemic	Plant and animal diseases which rapidly build up to highly abnormal and generally injurious levels
Erosion	The wearing away of the land's surface by water, wind, snow, ice, or other physical processes; it includes detachment, transport, and deposition of soil or rock fragments.
ESA	Endangered Species Act

Essential Habitat	Areas with essentially the same characteristics as critical habitat but not declared as such. These habitats are necessary to meet recovery objectives for Endangered, Threatened, and Candidate species.

F

FEIS	Final Environmental Impact Statement
Final Environmental Affect Statement	The final version of the public document required by the National Environmental Policy Act (see Draft Environmental Impact Statement).
Floodplain	Lowland and relatively flat areas adjoining streams, rivers, and lakes, which are periodically inundated by overbank flows of water.
Forage	All browse and non-woody plants available to livestock or wildlife for feed.
Forest Plan	Nez Perce National Forest Land and Resource Management Plan, September 1987
Forest and Rangeland Planning Act of 1974	An Act of Congress which requires the assessment of the nation's Renewable Resources renewable resources and the periodic development of a national renewable resources program. It also requires the development, maintenance, and, as appropriate, revision of land and resource management plans for the National Forests.
Forest Type	A classification of forest land based upon the live tree species present.
FP	Forest Plan
FR	Federal Register
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
Fuels	Includes both living plants and dead woody vegetation that are capable of burning in the event of fire
Fuels Management	Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality
USFWS	U.S. Fish and Wildlife Service

G

Geographic Information System	A computer program for manipulating landscape configuration data

Geomorphic Threshold	The percent increase of sediment over normal or natural conditions, which may result in unstable channel conditions in a stream system.
GIS	Geographic Information System

H

Habitat	A place where a plant or animal naturally or normally resides and grows
Habitat Effectiveness	The measure of how open roads affect utilization of habitat by elk
Habitat Type	An aggregation of all land areas potentially capable of producing similar plant communities at climax
Hiding Cover	Trees of sufficient size and density to conceal animals from view at 200 feet
HUC	Hydrologic Unit Code
Hydrologic Recovery	The process of revegetation of a disturbed area which returns the site to predisturbance levels of water runoff and timing of flow
Hydrologic Unit Code	A sequence of numbers or letters used to identify a particular hydrological feature, such as a river, reach, lake, or watershed

I

IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDPR	Idaho Department of Parks and Recreation
IDT	Interdisciplinary Team; ID Team
Indicator Species	Species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.
Indigenous	Having originated in and being produced, growing, living, or occurring naturally in a particular region or environment.
Indirect Effects	Effects caused by an action that occur later in time or further removed spatially, but are still reasonably foreseeable.
INFISH	Inland Native Fish Strategy, 28 July 1998
INFRA	Infrastructure Database used to record Forest Service roads and trails
Interdisciplinary Team	A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad

	to adequately solve the issues. Through interaction, team members bring different points of view to bear on any given issue.
Intermittent	A depression in the topography that has flowing water during the wet season (winter-spring) but is normally dry during the hot summer months; the area does not have a continuous year-round flow.
Invasive Species	Any non-native plant, such as spotted knapweed or yellow star thistle, which when established may become destructive and difficult to control by ordinary means of cultivation or other control practices.
Inventory Data	Recorded measurements, facts, evidence, or observations of forest resources, such as soil, water, timber, wildlife, range, geology, minerals, and recreation, which is used to determine the capability and opportunity for the Forest to be managed for those resources.
IPM	Integrated Pest Management
Irretrievable	Foregone or lost production, harvest or use of renewable natural resources; for example when a fire destroys a tree plantation, the effect is irretrievable but the loss of site productivity as measured by the presence of trees is not irreversible.
Irreversible	The removal of resources such that they cannot be produced again; this applies most commonly to nonrenewable resources, such as minerals or cultural resources, or to resources such as soil productivity that are renewable only over long periods of time. Loss of renewable resources can also be irreversible as in the replacement of a forest with a permanent road.
Issue	A subject or question of widespread public discussion or interest regarding management of National Forest System administered lands.

K

Key Habitat Components	Areas or features of the forest which are of particular importance for maintaining overall wildlife habitat; these areas and features include moist areas, wallows, meadows, parks, critical hiding cover, thermal cover, migration routes, and staging areas.

L

Land Allocation	The assignment of a management emphasis to particular land areas to achieve the goals of the issues, concerns, and opportunities identified during the planning process.
Landtype	An area of land classified on the basis of geomorphic attributes. An understanding of geological processes, as reflected in land surface form and features, individual kinds of soils, and the factors which determine the behavior of ecosystems (i.e.,

	climate, vegetation, relief, parent material, and time) is used as the basis for this classification system.
LAU	Lynx Analysis Unit
LIDAR	A remote sensing technology that works on a principal similar to that of radar but instead uses infrared light from a laser to illuminate a target and analyze the reflected light.

M

MA	Management Area
MA 1	Provide the minimum management necessary to provide for resource protection and to ensure public safety. Additional road construction will be allowed to manage adjacent areas.
MA 2	Provide and maintain sites for facilities necessary for the administration of Nez Perce National Forest lands.
MA 3	Manage to ensure that prehistorical, historical, archaeological, and/or paleontological sites are studied, preserved, or protected.
MA 4	Encourage valid exploration and development of mineral resources while minimizing surface effects from mineral activities.
MA 6	Manage areas for non-manipulative research, observation, and study of undisturbed ecosystems.
MA 7	Manage for developed recreational opportunities, providing interpretation and enhancement of cultural and natural resources. Maintain or enhance existing developed recreation sites.
MA 8.1, 8.2, and 8.3	Manage for outstanding remarkable values and free-flowing river conditions as specified in the Wild and Scenic Rivers Act of 1968, as amended.
MA 9.1, 9.2, and 9.3	Manage the wilderness values as specified by the Wilderness Preservation Act of 1964.
MA 10	Manage to protect or enhance riparian-dependent resources.
MA 11	Manage for high fishery/water quality objectives, wildlife security, and high quality dispersed recreation with no additional roads.
MA 12	Manage for timber production and other multiple uses on a sustained yield basis.
MA 13	Manage for timber production and other multiple uses on a sustained yield basis while meeting visual quality objectives of retention or partial retention in those areas of medium to high visual sensitivity. This management area consists of intermingled acreages of lands similar to those found in MA 12 and 17. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas.

MA 14	Manage for timber production and other multiple uses on a sustained yield basis while meeting visual quality objectives of retention or partial retention and improving the quality of winter range habitat for deer and elk. This management area consists of intermingled acreages of lands similar to those found in MA 12, 16, and 17. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas.
MA 15	Manage for timber production and other multiple uses on a sustained yield basis while improving the quality of deer and elk winter range. This management area consists of intermingled acreages of lands similar to those found in MA 12 and 16. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas.
MA 16	Manage to increase usable forage for elk and deer on potential winter range.
MA 17	Manage for timber production and other multiple uses on a sustained yield basis while meeting visual quality objectives of retention or partial retention.
MA 18	Manage to improve the quality of winter range habitat for deer and elk through timber harvesting or prescribed fires while meeting visual quality objectives of retention or partial retention in appropriate areas. This management area consists of intermingles acreages of lands similar to those found in MA 16 and 17. The heterogeneous spatial mix of these lands is the primary reason for identifying them as unique management areas.
MA 19	Manage for livestock forage production and other multiple uses on a sustained yield basis.
MA 20	Manage for old-growth habitat for dependent species.
MA 21	Manage grand fir-Pacific yew communities for moose winter range and other multiple uses.
MA 22 and 23	Manage to ensure that the Idaho water quality standards for community public supply water uses are met.
Management Area	An aggregation of capability areas, which have common management direction and may be non-contiguous in the Forest; consists of a grouping of capability areas selected through evaluation procedures and used to locate decisions and resolve issues and concerns.
Management Direction	A statement of multiple use and other goals and objectives, the associated management prescriptions, and the associated standards and guidelines for attaining them
Management Indicator Species	A plant or animal which, by its presence in a certain location or situation, is believed to indicate the habitat conditions for many other species

Management Practice	A technique or procedure commonly applied to Forest resources, resulting in measurable outputs or activities.
Management Prescription	Management practices and intensities selected and scheduled for application on a specific area to attain multiple use and other goals and objectives.
MIS	Management Indicator Species
Mitigation	Avoiding or minimizing effects by limiting the degree or magnitude of the action and its implementation; rectifying the effects by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the effect by preservation and maintenance operations during the life of the action.
Model	A theoretical projection in detail of a possible system of natural resource relationships. A simulation based upon an empirical calculation to set potential or outputs of a proposed action or actions.
Monitoring	An examination, on a sample basis of Forest Plan management practices, to determine how well objectives have been met and a determination of the effects of those management practices on the land and environment.

N

NAGPRA	Native American Graves Protection and Repatriation Act of 1990
National Environmental Policy Act; NEPA Process	An Act to declare a national policy that will encourage productive and enjoyable harmony between man and his environment, to promote efforts that will prevent or eliminate damage to the environment and biosphere, to stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish the Council on Environmental Quality. An interdisciplinary process, mandated by the National Environmental Policy Act, which concentrates decision making around issues, concerns, alternatives, and the effects of alternatives on the environment.
National Forest Management Act	A law passed in 1976 as amendment to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development.
National Forest System	All National Forest lands reserved or withdrawn from the public domains of the United States; all National Forest lands acquired through purchase, exchange, donations, or other means; the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012); and other lands, waters, or interests therein which are administered by the Forest Service or are

	designated for administration through the Forest Service as part of the system.
National Recreation Trails	Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the national system of trails authorized by the National Trails System Act. National recreation trails provide a variety of outdoor recreational uses in or reasonably accessible by urban areas.
National Register of Historic Places	A listing maintained by the National Park Service of areas which have been designated as being of historical value. The Register includes places of local and State significance, as well as those of value to the Nation as a whole.
Natural Sediment Production	The amount of sediment produced in a watershed prior to any management activities, such as roads or harvest; natural, or baseline, sediment is a function of parent material, soil type, degree of weathering, glacial influences, etc.
NEPA	National Environmental Policy Act
NEZSED	A computer model that analyzes and predicts effects of activities on water quality and quantity.
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest system
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
No Action Alternative	An alternative where no management activities would occur beyond those currently underway. The development of a No Action Alternative is in accordance with regulations implementing the National Environmental Policy Act (40 CFR 1502.14). The No Action Alternative provides a baseline for estimating the effects of other alternatives.
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
NPT	Nez Perce Tribe
NRLMD	Northern Rockies Lynx Management Direction

O

Objective	A specified statement of measurable results to be achieved within a stated time period; objectives reflect alternative mixes of all output of achievements which can be attained at a given budget level. Objectives may be expressed as a range of outputs.
OHV	Off-highway vehicle

Off-Highway Vehicle	Vehicles, such as four- and three-wheelers, motorcycles, and bicycles, which are designated to operate on primitive roads and trails, or to navigate cross-country where there are no constructed travel ways.
ORV	Off-road vehicle

P

PACFISH	The Decision Notice/Decision Record, Finding of No Significant Affect, and Environment Assessment for the interim strategies for managing anadromous fish producing watersheds in eastern Oregon and Washington, Idaho, and portions of California. It was published by the USDA Forest Service and USDI Bureau of Land Management in 1995.
Perennial Stream	A stream which normally flows throughout the year
PILT	Payment in Lieu of Taxes
PL	Public Law
Preferred Alternative	The Agency's preferred alternative, one or more, that is identified in the environmental document (EA or EIS).
Prescription	Management practices selected and scheduled for application on a designated area to attain specific goals and objectives.
Proposed Action	In terms of the National Environmental Policy Act, the project, activity, or action that a Federal Agency is proposing to implement or undertake and which is the subject of an environmental analysis.
Public Access	Usually refers to a road or trail route over which a public agency claims a right-of-way available for public use.
Public Involvement	A Forest Service process designed to broaden the information based upon which Agency decisions are made by (1) informing the public about Forest Service activities, plans, and decisions, and (2) encouraging public understanding about and participation in the planning processes, which lead to final decision making.
Public Issue	A subject or question of widespread public interest relating to management of the National Forest System.

R

Range Allotment	A designated area of land available for livestock grazing upon which a specified number and type of livestock may be grazed under a Range Allotment Management Plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.
Ranger District	Administrative subdivision of the Forest supervised by a District Ranger

Record of Decision	A document separate from, but associated with, and Environment Affect Statement that publicly and officially discloses the responsible official's decision about an alternative assessed in the Environmental Impact Statement chosen for implementation.
Recreation Opportunity Spectrum	The framework for stratifying and defining classes of outdoor recreation environments, activities, and experiences, which are arranged along a continuum or spectrum that is divided into seven classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded modified, roaded natural, rural, and urban.
Recruitment Old Growth	Timber stands that would meet old growth criteria within 100 years. Therefore, replacement old growth stands may consist of stands 50 years old or older. Used interchangeably with replacement old growth.
Replacement Old Growth	Timber stands that would meet old growth criteria within 100 years. Therefore, replacement old growth stands may consist of stands 50 years old or older.
Re-vegetation	The re-establishment and development of plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of humans; for example reforestation and range seeding.
Right-of-Way	Land authorized to be used or occupied for the construction operation, maintenance, and termination of a project facility passing over, upon, under, or through such lands.
Riparian Areas	Areas with distinctive resource values and characteristics that are comprised of aquatic and riparian ecosystems, 100-year floodplains, and wetlands; they also include all upland areas within a horizontal distance of approximately 100 feet from the edge of perennial streams or other perennial water bodies.
RMO	Resource Management Objective
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
Road Management	The combination of both traffic and maintenance management operations; traffic management is the continuous process of analyzing, controlling, and regulating uses to accomplish National Forest objectives. Maintenance management is the perpetuation of the transportation facility to serve intended management objectives.
Road Decommissioning	Activities that result in the stabilization and restoration of unneeded roads to a more natural state.
Roadless Area	An area of the Nation Forest which: 91) is larger than 5,000 acres or, if smaller, is contiguous to a designated wilderness area or primitive area; (2) contains no roads, and (3) has been

	inventoried by the Forest Service for possible inclusion in the wilderness preservation system.
Rotation	The planned number of years between the formation of a generation of trees and their harvest at a specified stage of maturity.

S

Scoping	The procedures by which the Forest Service determines the extent of analysis necessary for a proposed action; i.e. the range of actions, alternatives, and effects to be addressed, identification of significant issues related to a proposed action, and establishing the depth of environmental analysis, data, and task assignments needed.
Security Area	Any area which, because of its geography, topography, and/or vegetation, that will hold elk during periods of stress.
Sediment	Any material carried in suspension by water, which will ultimately settle to the bottom of streams.
Sediment Delivery Efficiency	A term describing how efficiently sediment is transported within a given portion of a stream
Sediment Yield	The amount of material eroded from the land surface by runoff and delivered to a stream system.
Semi-Primitive Non-Motorized	There is a high quality of experiencing solitude, closeness to nature, tranquility, self-reliance, challenge, and risk.
Semi-Primitive Motorized	There is a moderate opportunity for solitude, tranquility, and closeness to nature.
Sensitive Species	Species (plants or animals) with special habitat needs that may be influenced by management programs
SHPO	State Historic Preservation Office
Site Productivity	The production capability of special areas of land
Skid Trails	A travelway through the woods formed by loggers dragging (skidding) logs from the stump to a log landing without dropping a blade and without purposefully changing the geometric configuration of the ground over which they travel
Slash	The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storms, fires, girdling, or poisoning.
Snag	A standing dead tree used by birds for nesting, roosting, perching, courting, or foraging for food and by some mammals for escape cover, denning, and reproduction.
Snowmobile	Any self-propelled vehicle under 1,000 pounds unloaded gross weight, designed primarily for travel on snow or ice or over natural terrain, which may be steered by tracks, skis, or runners.

Soil Productivity	The capacity of solid to produce a specific crop, such as fiber and forage, under defined levels of management. It is generally dependent upon available solid moisture, nutrients, and length of the growing season.
Stand	A plant community of trees which possess uniformity in vegetation type, age class, vigor, size class, and stocking class and one which is distinguishable from adjacent forest communities.
Standard	An objective requiring a specific level of attainment; a rule to measure against; a guiding principle
Stream Order	A measure of the position of a perennial stream in the hierarchy of tributaries. First order streams are unbranched streams with no tributaries. Second order streams are formed by the confluence of two or more first order streams. Third order streams are formed by the confluence of two or more second order streams; they are considered third order until they join another third order or larger stream.
Subnivean	A zone that is in or under the snow layer; it can form when latent heat from the ground melts a thin layer of snow above it, leaving a layer of air between the ground and the snow. Subnivean animals include small mammals, such as mice, voles, shrews, and lemmings that must rely on winter snow cover for survival. These mammals move under the snow for protection from heat loss and predators.
Successional Stage	A phase in the gradual supplanting of one community of plants by another.
Suitable Forest Land	Forest land (as defined in CFR 219.13) for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions; for which there is reasonable assurance that such lands can be adequately restocked (as provided for in CFR 219.14), and for which there is management direction that indicates that timber production is an appropriate use of the area.
Supply Limited Stream	A supply (sediment) limited stream has more energy available during a typical year than there is sediment in the stream channel available to be moved. This excess energy leads to a resilience that enables the system to recover and cleanse itself if extreme sediment loads are not delivered in a short period of time.
System Road	A road that is part of the Forest development transportation system, which includes all existing and planned roads, as well as other special and terminal facilities designated as Forest development transportation facilities.

T

Temporary Roads	Roads which are necessary for emergency operations or authorized by contract, permit, lease, or other written

	authorization that is not a forest road and that is not included in a forest transportation atlas. Roads which are constructed for a one time or short-term use, which are not expected to be utilized in the future; these roads will be decommissioned after the need has passed.
Terrestrial	Living or growing on land
Thermal Cover	Cover used by animals to ameliorate effects of weather; for elk, a stand of coniferous trees 40 feet or taller with an average crown closure of 70% or more.
Threatened Species	Any species that is likely to become an endangered species within the foreseeable future through all or a significant portion of its range and one that has been designated as threatened in the *Federal Register* by the Secretary of the Interior.
Timber	A general term for the major woody growth of vegetation in a forested area.
TMDL	Total Maximum Daily Load
Topography	The configuration of land surface including its relief, elevation, and the position of its natural and man-made figures.
Trailhead	The parking, signing, and other facilities available at the terminus point of a trail.
Turbidity	Sediment or foreign particles stirred up or suspended in water.
Two-aged Stand	Two-aged regeneration or harvest method that removes sufficient trees to produce an exposed microclimate for the development of a new age class. Sufficient residual trees, representing at least 10% of full stocking, are trained to attain goals other than regeneration and create a two-aged stand.

U

Understory	Vegetation (trees or shrubs) growing under the canopy formed by taller trees.
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

V

Verified Old Growth	Stands that have been verified by field data, which is referred to as stand exam data. Verified old growth stands have met the minimum requirements of Green et al. 1992, errata 2011 old growth, and have been field verified by a silviculturist.
Viewshed	A total landscape as seen from a particular viewpoint.

Visual Quality Objectives	The degree of acceptable alteration of the characteristic landscape
Visual Resource	The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.
VQOs	Visual Quality Objectives

W

Wallow	A depression, pool of water, or wet area produced or utilized by elk or moose during the breeding season.
Watershed	The total area of land where all that is under it or drains off of it goes into the same place; the total area above a given point on a stream that contributes water to the flow at that point
Wilderness Character	Wilderness character attributes are: Natural Integrity, Apparent Naturalness, Outstanding Opportunities for Solitude, and Opportunities for Primitive, Unconfined Recreation. These features were evaluated using capability analyses as conducted in 1978 using the Wilderness Attribute Rating (WAR) System and in 2005 using the Area of Capability Assessment (ACA) Process. These analyses techniques rate wilderness character attributes as identified by the Wilderness Act of 1964.
Windthrow	Trees that are blown down by wind.
Windfirm	Trees able to withstand strong winds and resist windthrow (blow down), wind-rocking, and major breakage.
WSRA	Wild and Scenic River Act

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Appendix A – Maps

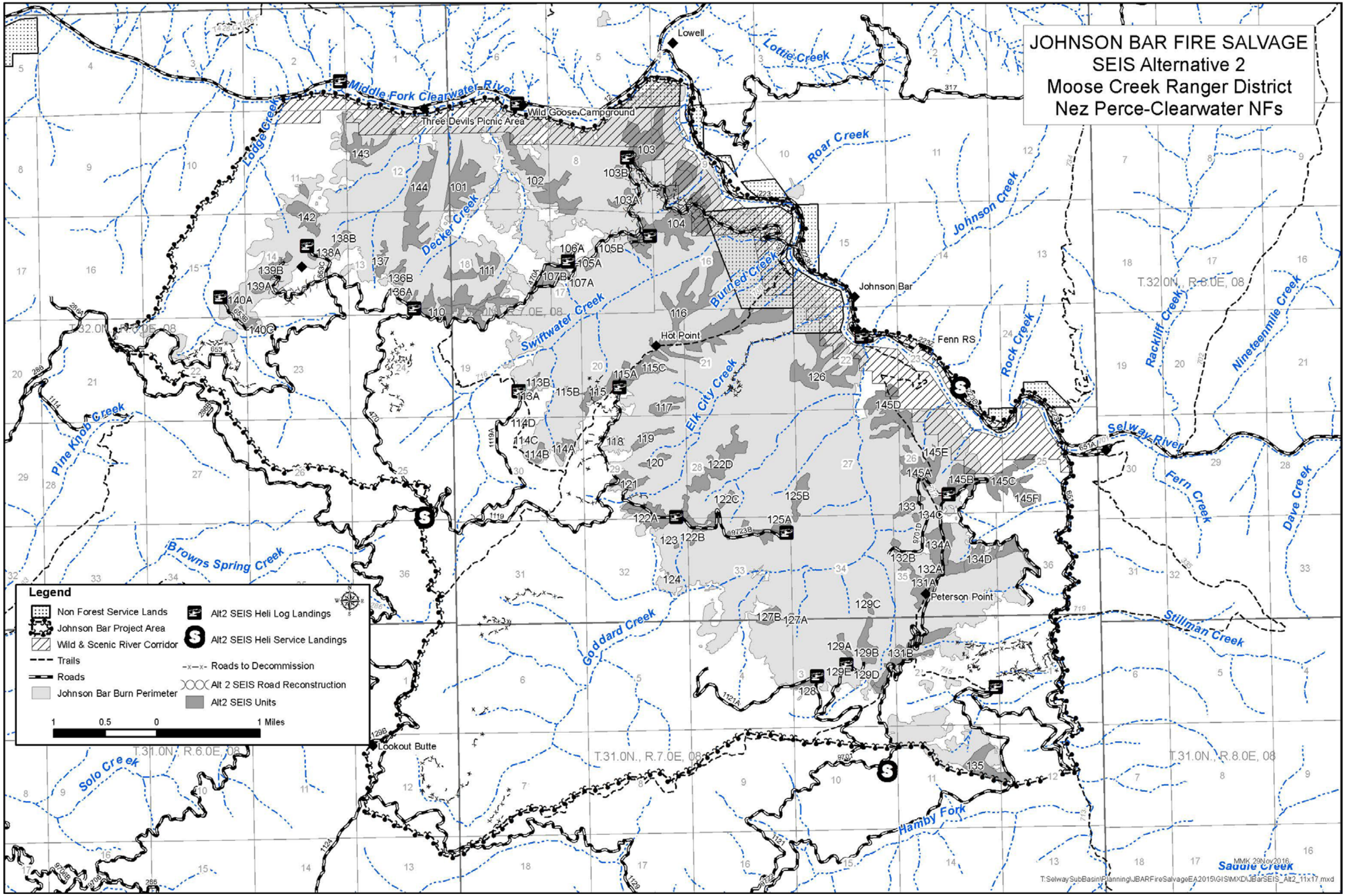

Figure 47. Johnson Bar Fire Salvage project Alternative 2 activity map

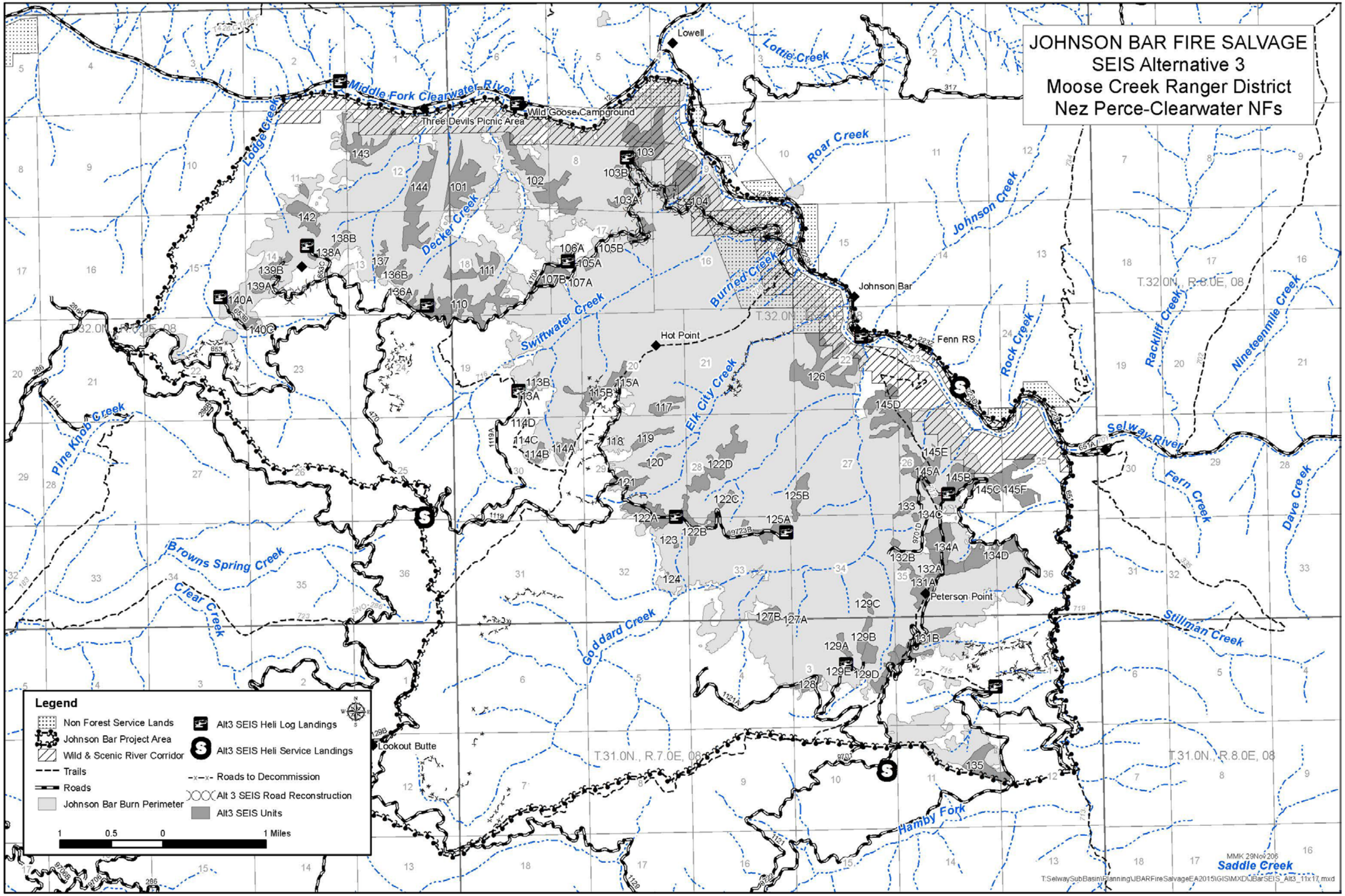

Figure 48. Johnson Bar Fire Salvage project Alternative 3 activity map

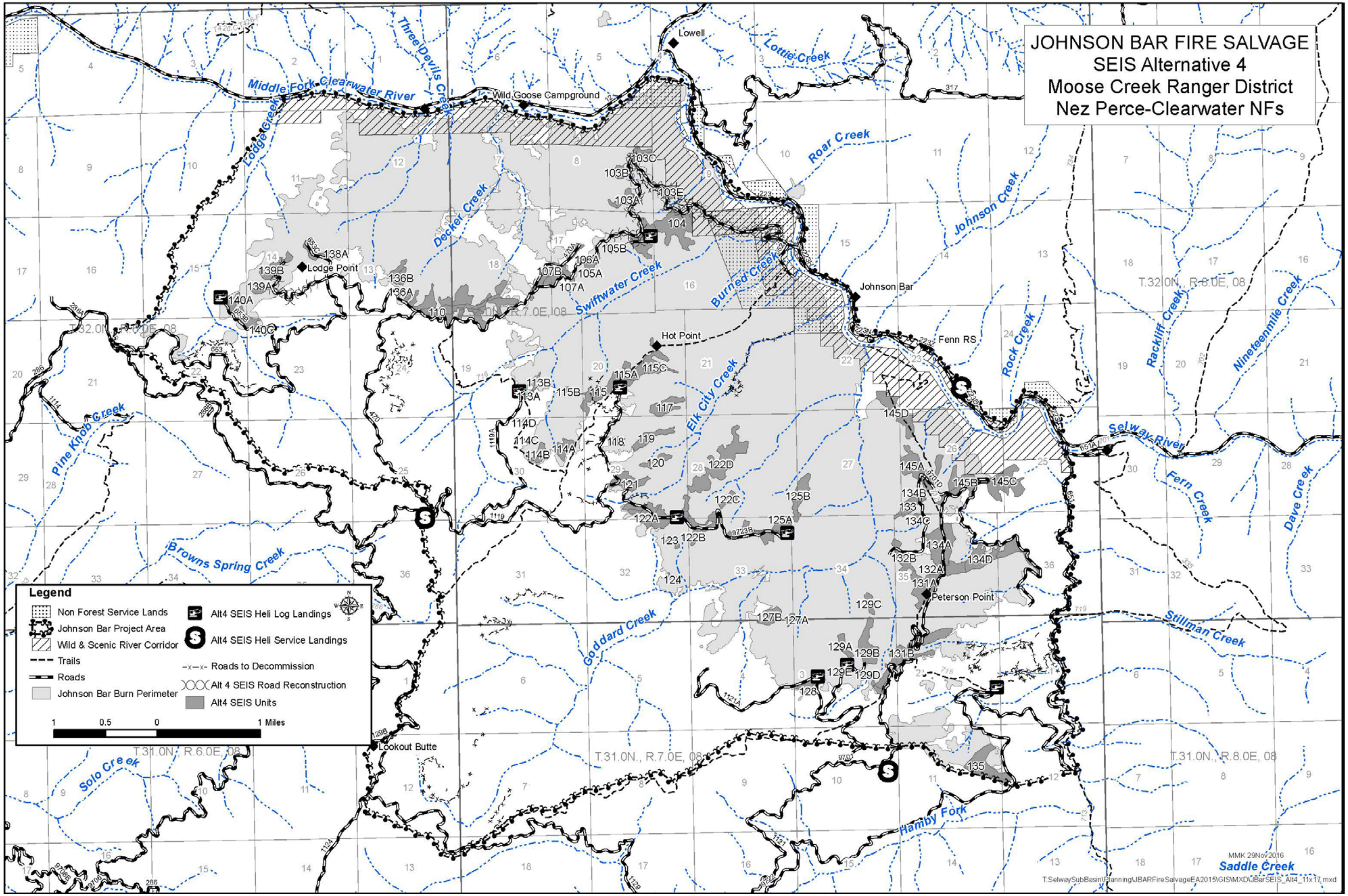

Figure 49. Johnson Bar Fire Salvage project Alternative 4 activity map

Appendix B – Unit Acres by Alternative

Table 45. Johnson Bar Fire Salvage project unit acres, logging systems, and temporary road miles for all action alternatives

UNIT	Alternative 2			Alternative 3			Alternative 4		
	Acres[a]	Temp Road (miles)[b]	Logging System[c]	Acres[a]	Temp Road (miles)[b]	Logging System[c]	Acres[a]	Temp Road (miles)[b]	Logging System[c]
101	74	n/a	H	74	n/a	H	Drop	n/a	n/a
102	91	n/a	H	91	n/a	H	Drop	n/a	n/a
103	148	0.26 new 0.06 exist	T, S, H	147	n/a	S, H	42	0.06 exist	T, S, H
104	125	0.35 exist	T, S, H	33	n/a	S	82	0.06 exist	T, S, H
105	11	n/a	T, S	11	n/a	S	11	n/a	T, S
106	9	n/a	T, S	9	n/a	S	9	n/a	T, S
107	35	n/a	T, S	35	n/a	T, S	35	n/a	T, S
108	Drop	n/a	n/a	Drop	n/a	n/a	Drop	n/a	n/a
109	Drop	n/a	n/a	Drop	n/a	n/a	Drop	n/a	n/a
110	109	0.11 exist 1.02 new	T, S	109	0.17 exist	S,H	109	0.11 exist 1.02 new	T, S
111	40	n/a	H	40	n/a	H	Drop	n/a	n/a
112	drop	n/a	n/a	Drop	n/a	n/a	Drop	n/a	n/a
113	7	n/a	S, H	7	n/a	S, H	7	n/a	S, H
114	26	n/a	T, S, H	26	n/a	S, H	26	n/a	T, S, H
115	84	0.21 new	S, H	48	n/a	S, H	84	0.21 new	S, H
116	232	n/a	H	drop	n/a	n/a	Drop	n/a	n/a
117	22	n/a	S, H	22	n/a	S, H	22	n/a	S, H
118	7	n/a	S	7	n/a	S	7	n/a	S
119	19	n/a	H	19	n/a	H	19	n/a	H
120	10	n/a	S, H	10	n/a	S, H	10	n/a	S, H
121	24	n/a	T, S	25	n/a	S	24	n/a	T, S
122	150	0.12 new	T, S, H	150	n/a	S, H	150	0.12 new	T, S, H
123	4	n/a	H	4	n/a	H	4	n/a	H
124	3	n/a	H	3	n/a	H	6	n/a	H
125	66	0.08 exist 0.13 new	T, S, H	66	n/a	S, H	66	0.08 exist 0.13 new	T, S, H
126	102	n/a	H	102	n/a	H	Drop	n/a	n/a
127	18	n/a	S, H	18	n/a	S, H	18	n/a	S, H
128	11	n/a	T, S, H	11	n/a	S, H	11	n/a	T, S, H
129	52	0.15 new	T, S, H	52	n/a	S, H	51	0.15 new	T, S, H
130	Drop	n/a	n/a	Drop	n/a	n/a	Drop	n/a	n/a
131	101	0.47 new	T, S	101	n/a	S,H	100	0.08 exist 0.4 new	T, S
132	26	n/a	S	26	n/a	S,H	26	n/a	S
133	17	n/a	H	17	n/a	H	17	n/a	H
134	121	0.05 new	T, S	120	n/a	S,H	135	0.07 new	T, S
135	42	n/a	S, H	42	n/a	S, H	42	n/a	S, H
136	19	0.24 new	S	19	n/a	S	19	0.24 new	S

UNIT	Alternative 2			Alternative 3			Alternative 4		
	Acres[a]	Temp Road (miles)[b]	Logging System[c]	Acres[a]	Temp Road (miles)[b]	Logging System[c]	Acres[a]	Temp Road (miles)[b]	Logging System[c]
137	13	n/a	H	13	n/a	H	Drop	n/a	n/a
138	23	n/a	S, H	23	n/a	S, H	12	n/a	S, H
139	26	n/a	S	26	n/a	S	26	n/a	S
140	29	n/a	H	29	n/a	H	29	n/a	H
142	40	n/a	H	40	n/a	H	Drop	n/a	n/a
143	45	n/a	H	45	n/a	H	Drop	n/a	n/a
144	95	n/a	H	95	n/a	H	Drop	n/a	n/a
145	273	0.16 new	S, H	273	n/a	S, H	151	0.16 new	S, H
	2348	0.6 exist 2.8 new	T = 4% S = 39% H=57%	1988	0.2 exist 0.0 new	T = 1% S = 22% H = 77%	1349	0.31 exist 2.57 new	T = 8% S = 57% H = 35%

[a] Temporary Roads: Exist = existing road template; New = new construction
[b] Logging system designators: T = Tractor, S = Skyline, H = Helicopter
[c] Some individual unit acres may vary from specialist’s report acres due to internal calculation rounding during analysis

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Appendix C – Salvage Operations and Tree Mortality Criteria

For all units within the project area, salvage operations would retain 14-28 live or dead trees per acre using a combination of selected single (large dbh) trees and clumps (9+ trees per clump) distributed across the unit. Of the 14-28 leave trees, 6 snags would be greater than 20 inches dbh, and of these 6 snags, 3 should be larger than 30 inches dbh.

Trees meeting the following criteria would be left on site:

- All tree species 25 inches or larger dbh;
- All dead western larch and ponderosa pine;
- All non-high risk white pine;
- Non-merchantable snags as long as there is no hazard according to OSHA regulations; and
- All live trees.

Trees with active bark beets would be considered dead.

To meet the guidelines, at least two criteria would need to be met under each species criteria, except for cedar. The following criteria would be used to determine fire damage tree survivability and leave tree selection:

Table 46. Criteria Used to determine tree mortality

Species	Dead Tree Selection Criteria
Two criteria must be met in order to be considered dead.	
Douglas-fir	1. 50% or more circumference of bole cambium at ground line is burned. 2. 25% or more crown scorch. 3. 50% or more of the area under tree crown has had duff removed by fire.
Lodgepole and all other species, except cedar	1. 25% or more circumference of bole cambium at ground line is burned. 2. 25% or more crown scorch 3. 50% or more of the area under tree crown has had duff removed by fire.
One criteria must be met in order to be considered dead.	
Cedar	1. 33% or more circumference of bole cambium at ground line is burned. 2. 25% or more crown scorch. 3. 50% or more of the area under tree crown has had duff removed by fire.

Appendix D – Transportation Analysis

Transportation Analysis

According to the Forest Service Road Management Policy published 12 January 2001, all NEPA decisions signed after 12 January 2002, which involve certain changes in the transporation system, must be informed by a Roads Analysis. In accordance with FSM 7712.1, this analysis was conducted at the project level scale and limited to the Johnson Bar Salvage project. The transportaion analysis was an interdisciplinary process that provided the Responsible Official with information on the needs, opportunities, and priorities for the road system in order to inform the decision making process. The analysis concluded that the remaining transportation system is the minimum needed for Forest needs, while at the same time, road decommissioning would move the area towards desired future conditions and reduce effects to fisheries and watersheds.

Road Decommissioning

Roads identified in this document for decommissioning are not needed for future land management activities. Roads are categorized as system or non-system roads. System roads are part of the inventoried Forest Service road system and are currently maintained for management activities. Non-system roads are not part of the inventoried Forest Service road system and are not maintained to any standard. These roads were identified through imagery (LiDAR) and ground surveys. Non-system roads are not open to public access and are typically grown over with trees and inaccessible. Non-system roads in this document are identified by JB-#.

Road decommissioning practices vary depending on the road location and the risk of road failure and are specific for each road. Practices vary from full recontour of the road back to natural slope to road abandonment which requires no ground disturbing activities.

Roads that have moderate to high risk of failure, that are near fish bearing streams or are being used by unauthorized vehicles would require full decompaction and natural slope recontour. All roads with stream crossings, heavy compaction from traffic or other watershed concerns would be recontoured including stream grade channel restoration. Roads identified in this project not meeting the above criteria may be abandoned. Abandoned roads typically require no stream crossing restoration, are well vegetated, are resistant to surface erosion and are not prone to mass failure. During implementation system and non-system roads are held to the same standards for decommissioning.

Road Storage

Roads identified in this document for road storage are needed for future land management activities but would not be used for access for an extended amount of time. Roads placed in storage do not require regular maintenance reducing funding required in order to maintain the Forest Service road system. Road storage practices vary depending on the risk of road failure and future access requirements. Practices vary from removal of culverts and addition of water bars to accommodate hydraulic flows to road closure devises to close the road to vehicle traffic. Each road placed into storage shall have a specific prescription designed to protect the watershed for the duration of road storage.

Road Maintenance

Each road used for timber haul in accordance with this project would be maintained or brought to standard for the road use. Roads will be either reconditioned or reconstructed before the start of the project based on the existing condition of the roadway. Road would also be maintained to standard throughout the project for safe traffic movement and protection of the watershed.

Reconditioning roads consists of standard maintenance, such as road blading, brushing, removal of small cut slope failures, small shoulder repair, applying rock in wet areas and removal of obstructions such as rocks and trees. Reconditioning also includes maintenance of existing culverts and installation of drainage dips.

Reconstruction of a roadway improves the roadway to bring it to required standards for haul. This includes replacing and installing new culverts for cross drains and live water culverts, placement of rock surfacing, placement of roadway fill, road realignment due to failures and installation of new signs or gates. Other activities may include installation of drainage dips, road blading, brushing and removal of obstructions.

The definitions above do not include all activities that can be completed under each classification; these definitions are for informational purposes only.

Below is a list of roads requiring road maintenance based on proposed use and the current condition of the roadway. As the project continues, road failures or different access may require the type of work and roads requiring work to change. This is an approximation of road work for the Johnson Bar Fire Salvage project.

Table 47. Road reconstruction effects

Road Number	Road Name	Proposed Work	Effects
470	Swiftwater	Reconstruction, includes culvert replacements and new installation and shoulder repair	Culvert replacement on perennial non-fish bearing tributaries to Swiftwater Creek. Increased sediment for short duration, unlikely to have measurable indirect effects to fisheries, no direct effects. Culvert replacement is approximately 1.5 miles above occupied steelhead habitat.
470B	Swiftwater Spur B	Reconstruction, includes removal of road closure and culvert installation	Culvert replacement on perennial non-fish bearing tributaries to Swiftwater Creek. Increased sediment for short duration, unlikely to have measurable indirect effects to fisheries, no direct effects. Culvert replacement is approximately 0.5 mile above occupied steelhead habitat.
653A	Lodge Point	Reconstruction, includes culvert installation	Culvert replacement in wetland/seep areas. No active stream channels, no downstream effects to fisheries in Lodge Creek.
653A1	Burning Lodge	Reconstruction, includes removal of road closure and culvert installation	Culvert replacement in wetland/seep areas. No active stream channels, no downstream effects to fisheries in Lodge Creek.

Road Number	Road Name	Proposed Work	Effects
653C	Dirty Socks	Reconstruction, includes culvert installation; may include removal of road closure	Culvert replacement in wetland/seep areas. No active stream channels, no downstream effects to fisheries in Lodge Creek.
9723B	Elk Ridge	Reconstruction, includes culvert installation	Replacement of a relief culvert, which is not in an active stream channel so there would be no downstream effects to fisheries in Elk City Creek.

Table 48. Road decommissioning effects

Road Number	Proposed Work	Effects
1129F, 1129F1	Store road and remove culverts	No detectable sedimentation increases are expected due to distance of activities (>3 miles above critical habitat in Goddard Creek) and low base flows in these tributaries during the timing of proposed activities.
JB-163, JB-168	Non-system road decommissioning; culvert removal associated with JB-163	No detectable sedimentation increases are expected due to distance of activities (>3 miles above critical habitat in Goddard Creek) and low base flows in these tributaries during the timing of proposed activities. Long-term benefits would include reduced risk of sedimentation and restored channel/hillslope stability at crossings.
JB-128, JB-129, JB-130, JB-131	Non-system road decommissioning and remove culvert	Potential short-term sedimentation increase to cutthroat trout in Elk City Creek. Culvert removal on JB-139 is approximately 1.5 miles above occupied habitat, downstream sediment effects would be minimal. Long-term benefits would include reduced risk of sedimentationand restored channel/hillslope stability at crossings. Approximately 1.6 miles of road decommissioning in modeled landslide prone areas, long-term benefits would include restoration of hillslope stability, restored subsurface flow paths, and reduced risk of hillslope failure and sediment delivery to streams.

Road Number	Proposed Work	Effects
JB-132 to JB-153	Non-system road decommissioning; culvert removal and crossing stabilization	No detectable sedimentation increases are expected in O'Hara Creek due to distance of activities (>0.1 mile above critical habitat) and low base flows in these tributaries during the timing of proposed activities. Long-term benefits would include reduced risk of sedimentation and restored channel/hillslope stability at crossings. Approximately 0.8 mile of road decommissioning in modeled landslide prone areas, long-term benefits would include restoration of hillslope stability, restored subsurface flow paths, and reduced risk of hillslope failure and sediment delivery to streams.
JB-177, JB-178	Non-system road decommissioning; culvert removal and crossing stabilization	No detectable short-term sedimentation increases are expected in the Selway River due to distance of activities (>0.5 mile above occupied habitat) and low base flows in these tributaries during the timing of proposed activities. Long-term benefits would include reduced risk of sedimentation and restored channel/hillslope stability at crossings. Approximately 0.4 mile of road decommissioning in modeled landslide prone areas, long-term benefits would include restoration of hillslope stability, restored subsurface flow paths, and reduced risk of hillslope failure and sediment delivery to streams.
77763, 77788, 77835, JB-108 to JB-113	System and non-system road decommissioning	No detectable short-term sedimentation increases are expected due to distance of activities from occupied habitat, lack of connectivity with perennial stream network, and timing of activities. Approximately 0.2 mile of road decommissioning in modeled landslide prone areas, long-term benefits would include restoration of hillslope stability, restored subsurface flow paths, and reduced risk of hillslope failure and sediment delivery to streams.

Appendix E – Activities Considered for Cumulative Effects

Table 49. Past, present, and reasonably foreseeable future projects within the Middle Fork Clearwater and Selway River drainages[a]

Project Name	Location	Project Type	Miles/Acres	Year(s)
Road Construction (Middle Fork)	Various[b]	Construction	1 mile	1930s
Road Construction (Middle Fork)	Various[b]	Construction	7 miles	1950s
Road Construction (Middle Fork)	Various[b]	Construction	6 miles	1970s
Road Construction (Middle Fork)	Various[b]	Construction	1 mile	1990
Road Construction (Selway)	Various[b]	Construction	6 miles	1920s
Road Construction (Selway)	Various[b]	Construction	19 miles	1930s
Road Construction (Selway)	Various[b]	Construction	6 miles	1950s
Road Construction (Selway)	Various[b]	Construction	33 miles	1960s
Road Construction (Selway)	Various[b]	Construction	34 miles	1970s
Road Construction (Selway)	Various[b]	Construction	21 miles	1980s
Road Construction (Selway)	Various[b]	Construction	5 miles	1990s
Road Reconstruction	653 Road/Lodge Creek Lodge Point Sale	Replace 5 culverts	2.2 miles	2013
Road Reconstruction	286A Road/ Lodge Creek Lodge Point Sale	Replace 4 culverts	0.9 mile	2013
Road Reconstruction	286D Road/ Lodge Creek Lodge Point Sale	Aggregate surfacing	0.2 mile	2013

Project Name	Location	Project Type	Miles/Acres	Year(s)
Road Reconstruction	Road 651; O'Hara Creek Road	Culvert replacement; upgrade to 100 year flow	4 culverts	2015
Road Reconstruction	Upper Road 651; O'Hara Creek Road	Spot surfacing to reduce surface erosion	3 miles	2015
Road Reconstruction	Lower Road 651; O'Hara Creek Road	Culvert replacement; upgrade to 100 year flow	3 culverts	2017-2018
Selway Road, Nineteen Mile culvert and Gedney bridge repair	Road 223/Selway Road	Culvert replacement, road reconditioning	1.7 miles of road reconditioning, culvert replacement, bridge repair	2016
Road Decommissioning	6 segments	Road decommissioning	4.7 miles	1990s
Road Decommissioning	13 segments	Road decommissioning	7.8 miles	1990s
Road Maintenance (Middle Fork)	All system roads	Road maintenance	7 miles/year	2016+
Road Maintenance (Selway)	All system roads	Road maintenance	10 miles/year	2016+
Wildfire	East side of project area	Wildfire	330 acres	1889
Wildfire	Northwest corner of project area	Wildfire	469 acres	1910
Wildfire	Lower $^{2}/_{3}$ of project area	Wildfire	2,157 acres	1919
Wildfire	Southwest corner	Wildfire	117 acres	1880
Wildfire	Majority of Selway area	Wildfire	8,978 acres	1889
Wildfire	Southeast corner	Wildfire	900 acres	1919
Wildfire	South central area	Wildfire	807 acres	1920
Wildfire	South central area	Wildfire	3,124 acres	1928
Wildfire	Southeast area	Wildfire	1,352 acres	1945
Wildfire	Johnson Bar Creek	Wildfire	0.5 acre	1992
Wildfire	Hot Point	Wildfire	15 acres	1999
Johnson Bar Wildfire	¾ of Middle Fork area	Wildfire	2,238 acres	2014
Johnson Bar Wildfire	Majority of Selway area portion of project area	Wildfire	9,854 acres	2014

Project Name	Location	Project Type	Miles/Acres	Year(s)
Johnson Bar Hand Fireline	1 segment on ridgetop	Fireline	1.8 miles	2014
Johnson Bar Hand Fireline	16 segments on ridgetop	Fireline	8.7 miles	2014
Johnson Bar Dozer Fireline	3 segments on ridgetop	Dozer fireline	2.0 miles	2014
Johnson Bar Dozer Fireline	4 segments on ridgetop	Dozer fireline	2.1 miles	2014
Johnson Bar Excavator Fireline	1 segment on ridgetop	Excavator fireline	1.2 miles	2014
Johnson Bar Fuel Break	Road 651, 9701, and 9723B	Install drop inlet structures, including lid at cross drains	31 drop inlets and 7 lids	2014
Johnson Bar fire BAER Work	652 Road	Culvert removal	1 culvert	2014
Wash Wildfire	South of Selway; O'Hara Creek to Horse Creek	Wildfire	35,645 acres	2015
Slide Wildfire	North of Selway; Johnson Creek to Renshaw Creek	Wildfire	10,325 acres	2015
Pre-commercial Thinning	011707A020300087000	Pre-commercial Thinning	13 acres	2005
Pre-commercial Thinning	011707A020300093000	Pre-commercial Thinning	3 acres	2005
Pre-commercial Thinning	011707A020300118000	Pre-commercial Thinning	4 acres	2005
Pre-commercial Thinning	011707A020300121000	Pre-commercial Thinning	11 acres	2005
Pre-commercial Thinning	011707A020200053000	Pre-commercial Thinning	31 acres	2013
Pre-commercial Thinning	011707A130100004000	Pre-commercial Thinning	26 acres	2013
Pre-commercial Thinning	011707A130100006000	Pre-commercial Thinning	20 acres	2013
Pre-commercial Thinning	011707A130100008000	Pre-commercial Thinning	15 acres	2013
Pre-commercial Thinning	011707A140100121000	Pre-commercial Thinning	9 acres	2013
Pre-commercial Thinning	011707A140100126000	Pre-commercial Thinning	6 acres	2009
Pre-commercial Thinning	011707A140100127000	Pre-commercial Thinning	14 acres	2013

Project Name	Location	Project Type	Miles/Acres	Year(s)
Pre-commercial Thinning	011707A140300002000	Pre-commercial Thinning	14 acres	2013
Pre-commercial Thinning	011707A140300010000	Pre-commercial Thinning	10 acres	2013
Pre-commercial Thinning	011707A140300018000	Pre-commercial Thinning	30 acres	2013
Pre-commercial Thinning	011707A140400037000	Pre-commercial Thinning	23 acres	2013
Range	South end (Tahoe-Clear Creek Grazing Allotment)	Cattle grazing	4,907 acres	1930s-foreseeable future
653 Trail Recreation Use	Lodge Point to Two Shadows	Trail maintenance/use	3.5 miles	1930s-1970s
706 Trail Recreation Use	Hot Point	Trail maintenance/use	4 miles	1930s-present
712 Trail Recreation Use	Peterson Point	Trail maintenance/use	8 miles	1930s-1990s
716 Trail Recreation Use	Swiftwater	Trail maintenance/use	3 miles	1930s-1970s
706 Trail Recreation use	Hot Point	Trail maintenance/use	4 miles	2016+
Snowmobile Routes	Roads 286, 286A, and 653	Snowmobile recreational use	56 miles (9 miles within project area)	1970s-foreseeable future
Snowmobile Routes	Roads 289, 470, 651, 1119, 1121, 1129, 9701, and 9722	Snowmobile recreational use	52 miles (33 miles within project area)	1970s-foreseeable future
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	80 acres	1950s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	440 acres	1960s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	906 acres	1970s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	49 acres	1990s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	101 acres	2000s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	325 acres	1960s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	680 acres	1970s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	233 acres	1980s

Project Name	Location	Project Type	Miles/Acres	Year(s)
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	937 acres	1990s
Clearcut harvesting	Various[c]	Activity 4111, 4113, 4117; clearcut	257 acres	2000s
Seedtree/Shelter Wood	Various[c]	Activity 4131 and 4132	26 acres	1960s
Seedtree/Shelter Wood	Various[c]	Activity 4131 and 4132	30 acres	1970s
Seedtree/Shelter Wood	Various[c]	Activity 4131 and 4132	23 acres	1990s
Seedtree/Shelter Wood	Various[c]	Activity 4131 and 4132	121 acres	2005
Seedtree/Shelter Wood	Various[c]	Activity 4131 and 4132	130 acres	1980s
Seedtree/Shelter Wood	Various[c]	Activity 4131 and 4132	46 acres	1990s
Seedtree/Shelter Wood	Various[c]	Activity 4131 and 4132	14 acres	2005
Commercial Thinning	Various[c]; include Lodge Point acres	Activity 4220	450 acres	2010
Commercial Thinning	Various[c]; include Lodge Point acres	Activity 4220	135 acres	1980s
Commercial Thinning	Various[c]; include Lodge Point acres	Activity 4220	148 acres	2000
Salvage	Various[c]	Activity 4151 and 4231	286 acres	1970
Salvage	Various[c]	Activity 4151 and 4231	77 acres	1980
Salvage	Various[c]	Activity 4151 and 4231	539 acres	2000
Salvage	Various[c]	Activity 4151 and 4231	13 acres	1960s
Salvage	Various[c]	Activity 4151 and 4231	193 acres	1970s
Salvage	Various[c]	Activity 4151 and 4231	164 acres	1980s
Salvage	Various[c]	Activity 4151 and 4231	190 acres	1990s
Salvage	Various[c]	Activity 4151 and 4231	47 acres	2000s
Lodge Point Sale	Lodge Point	Stewardship sale	598 acres of commercial thinning; open 4.3 miles of	2013-2015

Project Name	Location	Project Type	Miles/Acres	Year(s)
			old roads and decommission when done; construct 1.1 miles of new temporary roads and obliterate when done; chip/haul 2,800 tons of biomass	
O'Hara Hazard	O'Hara Campground	Hazard timber sale	30 dead trees	2014
Iron Mountain Stewardship	Iron Mountain area	Regeneration harvest and watershed improvements	408 acres; 3.5 miles	2014-2016
Clear Creek Timber Sale	Clear Creek	Timber sale and watershed improvements	4156 acres regeneration; 4,551 acres intermediate	2015-2022
Lowell Wildland-Urban Interface (WUI)	North and east of Lowell	Timber sale	160 acres	2016
101 Roadside Hazard	101/Smith Creek and Swan Creek roads	Timber sale	46 acres; strip above or below roads	2016/2017
Wash Roadside Hazard	Road 44/Falls Point; Wash Fire area	Timber sale	91 acres; strips above or below road	2017
Woodrat fire Salvage	West of Syringa; Woodrat Fire area	Timber sale	350 acres	2017
Baldy Roadside Hazard	Southeast of Baldy Mountain in South Fork Clearwater River; Baldy Fire area	Timber sale	25 acres	2017
Private Timber Harvest	Mouth of Selway River	Salvage/regeneration	80 acres	2014
Private Timber Harvest	Selway River face near Elk City Creek	Salvage	120 acres	2015-2016
State of Idaho Timber Harvest	South of Swiftwater Creek	Salvage/regeneration	167 acres	2015
Landslide	Stand 01170714040060	Landslide	250 feet by 1,200 feet	1995/1996
Landslide	Stand 01170713020099	Landslide	100 feet by 650 feet	1995/1996

Project Name	Location	Project Type	Miles/Acres	Year(s)
Clear Creek Prescribed Fire	Clear Creek Roadless Area	Prescribed fire	1,371 acres	2015-2017
Fenn Face	North of Fenn Ranger Station	Prescribed fire	1,000 acres	2016
North Selway	Southwest of Coolwater	Prescribed fire	1,000 acres	2017

[a]Not all projects are independent but rather overlap the same area
[b]See GIS layer and historic road data spreadsheet
[c] See GIS layer for stands

Appendix F – Upward Trend Analysis

Upward Trend Analysis for Prescription watersheds that are not currently meeting Fishery Water Quality Objectives and Habitat Potential (Nez Perce LRMP Appendix A)

Upward trend analyses are required for Lodge, Goddard and Lower O'Hara Creeks because the proposed timber harvest in these prescription watersheds are considered an "entry" by Forest Plan Appendix A guidance (Conroy and Thompson 2011) and these watersheds do not currently meet their Fishery water quality objectives (Forest Plan, Appendix A) based on measured cobble embeddedness. An entry is defined as proposed activities which could increase sediment yield in the watershed.

Nez Perce Forest Plan Appendix A addresses trends in below objective watersheds with upward trend direction. Upward trend means that stream conditions determined through analysis to be below the Forest Plan objective will move toward the objective over time. The Forest Plan did not specifically intend that the improving trend be in place prior to initiation of new activities (Conroy and Thompson 2011). The following evaluation includes upward trend assessments for Lodge, Goddard and Lower O'Hara Creek prescription watersheds. Decker, Unnamed No. 8 and Swiftwater Creeks do not have upward trend requirements; however, trend data for Swiftwater Creek was available and was included for informational purposes only.

The Lower Selway and Middle Fork Clearwater Face prescription watersheds do not have water quality objectives and are also not discussed.

Proposed Johnson Bar Fire Salvage Activities

The Johnson Bar project proposes a variety of projects to improve watershed health and function and help to maintain upward trends in project area streams. These activities would occur under all action alternatives and are described in Table 50.

Table 50. Summary of watershed improvement projects proposed and implemented in the Johnson Bar Fire Salvage project

Activity	Quantity	Description
System Road Decommissioning	1.2 miles	Road decommissioning practices vary depending on the potential of landslides and other erosion conditions associated with the road, the land type the road is on, and its proximity to fish bearing streams. While some roads can be abandoned, most roads require full decompaction and slope recontouring. All system roads proposed for decommissioning would be recontoured. A minimum of 6 stream crossings would be removed. Where culverts are removed, stream banks are sloped back, and stream channels are restored. A total of 0.8 of these miles occur within PACFISH RHCAs.
Non-system Road Decommissioning	20 miles	Non-system roads are old skid trails, jammer roads, or temporary roads used for past harvest activities. Soil would be decompacted and roads would be fully recontoured on about 10 miles. A minimum of 51 stream crossings would be removed. About 10 miles of road would be abandoned. Generally, abandoned roads have no stream crossings, are well vegetated, are resistant to surface erosion, and are not prone to mass failure. Where culverts are removed, stream banks are sloped back, and stream channels are restored. A total of 6 of these miles occur within PACFISH RHCAs.

Activity	Quantity	Description
Road Storage System Roads	4.7 miles	Roads needed for long term management but not needed in the short term (<10 years) would be stored. A total of 13 culverts would be removed and the roads placed in a hydrologically stable condition. Where culverts are removed, stream banks are sloped back, and stream channels are restored. No motorized access would be allowed on these roads.
Road Recondition	51 miles	Portions of the total length would be treated as needed. Consists of standard maintenance, such as road blading, brushing, cleaning of culverts, removal of small cutslope failures, application of rock in wet spots and removal of obstructions such as trees, rocks, etc.
Road Reconstruction	6 miles	Portions of the total length would be treated as needed. Includes spot aggregate placement, blading, brushing and removal of obstructions, reshaping of drainage dips and road bed, and replacement or addition of cross drain culverts. A total of 3 culverts would be replaced on small headwater streams/seeps.

Vegetation management activities and temporary road construction are also proposed as part of the Johnson Bar Salvage Project. The activities by alternative are shown in Table 51. Log haul is the activity that has the highest risk of contribute sediment to streams outside of culvert removals and replacements.

Table 51. Vegetation management and temporary road construction activities

Activity	Alt. 2	Alt. 3	Alt. 4	Description
Salvage Harvest (acres)	2,348	1,988	1,349	Salvage harvest would remove dead and dying trees while leaving 14-28 standing trees per acre and retaining 17-33 tons/acre of downed woody material.
Temporary Road Construction (miles)	3.4	0.2	3.2	Temporary roads would constructed to provide for log removal. They would be obliterated within 2 years of harvest and would not be open to motorized vehicles after use.
Tractor Swing Trails (miles)	4.4	0.2	4.4	Swing trails would be located on ridge crests and obliterated after use.
Log Haul (miles of road)	62	62	62	Roads would be used to haul up to an estimated 5,036 loads of logs under Alternative 2, roughly 4,280 loads under Alternative 3, and 2,870 loads under Alternative 4. All roads would be dust abated prior to hauling activities.

Project design features would be used in conjunction with all activities in order to minimize or eliminate sediment delivery to streams and affects to aquatic habitats. They include in part: PACFISH buffer retention including around landslide prone areas, erosion control during culvert removals and replacements, dust abatement on all haul roads, log haul timing restrictions to dry or frozen road conditions, no temporary road construction or swing trails in RHCAs and therefore no temporary roads or swing trails with stream crossings or hydrologic connectivity to streams. The project would implement best management practices (BMPs) from the Idaho Forest Practices Act and Soil and Water Conservation

Handbook and the 2012 National Best Management Practices to prevent non-channelized sediment delivery to streams from harvest units and road building and maintenance.

Past Activities Contributing to Upward Trend

Past activities that have contributed towards upward trends in the project area include culvert replacements, road drainage improvements, road decommissioning, motorized vehicle access management, regular road maintenance on major travel routes, and the retention of no-harvest streamside buffers adjacent to timber harvest units since the 1970s.

Road decommissioning restores crossings to natural conditions including revegetation of the hillslopes and streambanks. Crossing removal eliminates the risk for crossing and road fill failures and potential chronic sediment sources from the landscape. The also allow for streams to function properly with respect to large wood and sediment movement downstream. A total of 24 miles of road decommissioning occurred in the 1990s in Swiftwater, Goddard, and Lodge Creeks and removed about 62 culverts.

Replacing culverts with those designed to handle 100-year flow events also reduces the risk of culvert plugging and failure with subsequent sediment input to streams. Culvert replacements have occurred in O’Hara Creek in 2015 (Road 651- 4 pipes) and Lodge Creek in 2013 (Road 653- 5 pipes; Road 286A- 4 pipes) in order to reduce the risk of culvert failures.

Road maintenance and improvements are designed to keep roads in optimum conditions for travel as well provide for adequate drainage and surfacing to protect the road from excessive and unwanted surface or ditchline erosion. Forest Road 651 (O’Hara) and Road 470 (Swiftwater) are graveled and receive regular maintenance in order to alleviate road erosion and subsequent sediment delivery problems.

Road position and surfacing greatly reduces the risk of sediment delivery to streams. Project area roads are mostly located on or near ridgetops and have relatively few stream crossings, or are graveled or paved which helps to minimize their contributions of sediments or other contaminants to streams. A study by Swift (1984) showed that placement of crushed rock reduced sediment production by 70 percent from the unsurfaced condition. There are 7 miles (8%) of paved road, 58 miles (62%) of graveled roads, and 28 miles (30%) of native surface roads in the project area.

Road access management contributes to an upward trend through road use restrictions that limit access to roads particularly during the wet fall and spring seasons when sediment is most likely to be delivered to streams. A total of 38% of all roads in the project area are open to motorized vehicle use at some time of the year. Only 6% of all roads are seasonally opened native surface roads and 32% of all roads are open year round and are graveled. The restriction of 68% of all roads to motorized use either year round or seasonally is expected to contribute to an upward trend.

Streamside buffers are designed to eliminate or reduce sediment delivery to streams from timber harvest activities and to maintain the components necessary to maintain and improve aquatic habitats (i.e., wood, sediment, bank stability, shade). Buffers were retained adjacent to harvest units from the 1970s through 1995 (prior to PACFISH requirements). Imagery shows most streams except for some very small headwater areas retained buffers of 50’ or wider. The buffers were generally 150’ or wider on mainstem streams such as Swiftwater and Goddard Creeks. Buffers retained after 1995 were 150’ wide on perennial non-fish bearing streams and 300’ on fish bearing streams as per PACFISH standards. Recent buffer monitoring on the Clearwater National Forest showed no delivery of sediment to either the buffer or to streams after harvest and burning treatments (USDA Nez Perce-Clearwater Forest, 2016).

Upward Trend Assessment by Prescription Watershed

An Upward Trend assessment was conducted for each of the Forest Plan Prescription watersheds functioning below water quality/fisheries objectives. Alternative 1 (existing post-fire condition) was compared to Alternatives 2 (maximum alternative) for the short-term (0-5 years) and long-term (>5 years). Activities were given a rating based on the indicators shown in Table 52. Number ranges for each of the ratings were based on the relative affect at the Prescription watershed scale. The Upward Trend determination was calculated by assigning a value to the Low, Moderate, and High ranking (L=1, M=2, H=3) and then summarized. Vegetation treatment ranking system is slightly different, “High” ranking speaks to a greater ECA area or burned acres (L= -1, M= -2, H= -3).

Table 52. Rating indicators

Proposed Activities	High	Moderate	Low
Vegetation Treatments			
Total harvest and burn	>40% of watershed acres	15-40% of watershed acres	<15% of watershed acres
Regen harvest	>25% of watershed acres	10-25% of watershed acres	<10% of watershed acres
Temporary Road Construction	>5% of watershed acres	2-5% of watershed acres	<2% of watershed acres
Road Improvement			
Road reconstruction	>75% of total roads	50-75% of total roads	<50% of total roads
Road recondition	>25% of total roads	15-25% of total roads	<15% of total roads
Road Decommissioning	>50% reduction	25-50% reduction	<25% reduction
RHCA Road Decommissioning	>50% reduction	25-50% reduction	<25% reduction
Non-System Road Decommissioning	>40 miles	20-40 miles	<20 miles
Stream Crossing Improvements	>20	10-20	<10

Lodge Creek Upward Trend Analysis

Past activities contributing towards upward trend in Lodge Creek include:

- Replacement of 9 culverts in 2013 on roads needed for future management. Replacements reduce the risk of culvert failure and subsequent sediment delivery by increasing the size of the pipes.
- Decommissioning of 9 miles of road not needed for future management. A total of 21 stream crossings were removed which eliminates a potential sediment delivery point, eliminates potential fill failure risk and returns the stream channel to natural conditions
- A total of 5.5 miles of road are open year round to motorized traffic. They are graveled and cross drain structures are in place to limit sediment delivery to streams. The remaining 15 miles of road are closed year round which minimizes potential sediment delivery from motorized use.
- Streamside buffers were retained along perennial streams adjacent to harvest units since the 1970s. Buffers provide for streambank stability, shade, and current and future woody material needed for aquatic habitat development.

Table 53. Johnson Bar proposed action potential effects in Lodge Creek

Action	Process Affected	Characteristic Indicator	Alt 1 (Existing Condition)	Alt 2 Short-term	Alt 2 Long-term	Explanations
Vegetation Treatments	Surface erosion	Pulse and Chronic Sediment	-L	-L		Moderate to low burn severity ~20% of the watershed. Alt 2 salvages 79 acres (3% of watershed). Estimated increase in sediment yield from project is 6%. Cumulative sediment yield is 23%. Forest Plan allowed is 60%. Understory growth and PACFISH buffer and down wood retention in units expected to minimize surface erosion.
	Mass failure risk	Pulse sediment				No vegetation treatment or skid trail construction would occur on landslide prone or high mass wasting areas
	Infiltration, runoff, peaks	Hydrologic process	-L	-L		Compacted soils minimized by skyline and helicopter harvest methods. Peak flows mitigated by post-harvest treatments and road decommissioning efforts.
	Solar heating	Riparian shade				No vegetation treatment would occur in RHCAs.
Temporary Road Construction	Surface erosion	Pulse and Chronic Sediment				Less than 0.1 miles (0.4 acres) of swing trail near ridge. No temporary road construction. No RHCA disturbance and no delivery to streams expected based on location and monitoring in 2014. Swing trail would be obliterated after harvest.
	Mass failure risk	Pulse sediment				No harvest on landslide prone and no road construction
	Infiltration, runoff, peaks	Hydrologic process		-L		Compacted soils could limit infiltration and concentrate flow in the short-term. Swing trail would be decompacted and revegetated.
	Solar heating	Riparian shade				No harvest or swing trails in RHCAs

Action	Process Affected	Characteristic Indicator	Alt 1 (Existing Condition)	Alt 2 Short-term	Alt 2 Long-term	Explanations
Road Improvement	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Road maintenance is ongoing, ditch cleaning, minor road improvements/reconditioning (USFS 653 and 653B). Two culverts installed on Rd653A. Log haul could increase sediment delivery at 18 crossings in the short-term. Dust abatement would reduce the risk and quantity. Gravel placement would reduce sediment delivery in the long-term.
	Infiltration, runoff, peaks	Hydrologic process	-L	+M	+M	Gravel placement would slow overland flow and reduce runoff.
Road Decommissioning	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Potential for increased sediment delivery at 5 stream crossings during road decom activities and until road is revegetated (2 years). Total of 1.8 miles decom.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Compacted soils allow for increased overland flow. Once roads are decompacted and recontoured infiltration would increase and concentrated overland flow would diminish. Five culverts would be removed.
	Solar heating	Riparian shade			+L	Vegetative recovery and tree growth in long-term
Road Storage	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Potential for increased sediment delivery at 7 stream crossings during removal until crossings are revegetated (2 years). Total of 0.8 miles stored.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Road placed in hydrologically stable condition. Seven culverts removed. Infiltration would increase and concentrated overland flow would diminish. Stream channels placed in natural condition
Stream Crossing Improvement	Surface erosion	Pulse and Chronic Sediment		-L	+L	Two crossings replaced under stored Road 653-A. Short-term, localized sediment could be delivered during implementation and until road fill slopes are stabilized and revegetated. Long-term culverts would allow for 100 year flows. Very small streams involved (<12" wide).
	Mass failure risk	Pulse sediment		+L	+L	
	Infiltration, runoff, peaks	Hydrologic process				
		Total	-9	-2	+10	Post-fire sedimentation effects from surface erosion not likely to be detectable due to minimal burning. Proposed harvest activities under Alternative 2 would be minimal given harvest methods and project design criteria. Proposed road improvements and decommissioning efforts would be long-term beneficial watershed improvements.

Lodge Creek Upward Trend Summary: The current upward trend for aquatic habitat conditions and fish habitat capacity is expected to continue in the Lodge Creek because of road improvements and decommissioning associated with the project, the relatively intact RHCAs, and the implementation of design features and BMPs which have been shown to be 95-100% effective (USDA Forest Service, 2009). Proposed actions place the prescription watershed in improved conditions over the existing condition, especially with the removal of 13 stream crossings.

Goddard Creek Upward Trend Analysis

Past activities contributing towards upward trend in Goddard Creek include:

- Decommissioning of 5.8 miles of road not needed for future management. A total of 21 stream crossings were removed which eliminates a potential sediment delivery point, eliminates potential fill failure risk and returns the stream channel to natural conditions
- A total of 3 miles of road are open year round to motorized traffic. They are graveled, have 3 stream crossing and cross drain structures are in place to limit sediment delivery to streams. A total of 7 miles are open seasonally (50% are graveled). The remaining 12.4 miles of road (10 miles graveled, 2.4 native surfaced) are closed year round which minimizes potential sediment delivery from motorized use.
- Streamside buffers were retained along perennial streams adjacent to harvest units since the 1980s. Buffers provide for streambank stability, shade, and current and future woody material needed for aquatic habitat development.

Table 54. Johnson Bar proposed action potential effects in Goddard Creek

Action	Process Affected	Characteristic Indicator	Alt 1 (Existing Condition)	Alt 2 Short-term	Alt 2 Long-term	Explanations
Vegetation Treatments	Surface erosion	Pulse and Chronic Sediment	-L	-L		Low to moderate burn severity ~40% of the watershed. Alt 2 salvages 490 acres (5% of watershed). Estimated increase in sediment yield from project is 5%. Cumulative sediment yield is 7%. Forest Plan allowed is 45%. Understory growth throughout and PACFISH buffer and down wood retention in units is expected to minimize surface erosion based on 2016 helicopter flight.
	Mass failure risk	Pulse sediment				No vegetation treatment, temporary roads or swing trail construction on landslide prone or high mass wasting areas.
	Infiltration, runoff, peaks	Hydrologic process	-L	-L		Only short-term increases in post-fire runoff is expected given the percentage of moderate to high burn severity throughout much of the drainage. Compacted soils minimized by skyline (47%) and helicopter (48%) harvest methods. Peak flows mitigated by post-harvest treatments and road decommissioning efforts.
	Solar heating	Riparian shade	-L			<10% of RHCAs burned at low fire severity. No vegetation treatment would occur in RHCAs.
Temporary Road Construction	Surface erosion	Pulse and Chronic Sediment				Approximately 0.4 miles of temporary road and 1.3 miles of swing trails (7 acres total), none within RHCAs or stream crossings. No RHCA disturbance and no delivery to streams expected based on location and monitoring in 2014. Roads would be obliterated after harvest.
	Mass failure risk	Pulse sediment				No temp road construction would occur on landslide prone or high mass wasting areas.

Action	Process Affected	Characteristic Indicator	Alt 1 (Existing Condition)	Alt 2 Short-term	Alt 2 Long-term	Explanations
	Infiltration, runoff, peaks	Hydrologic process		-L		Compacted soils could limit infiltration and concentrate flow in the short-term. Roads would be decompacted, recontoured, and revegetated.
	Riparian shade	Riparian condition				No temp road or swing trail construction in RHCAs
Road Improvement	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Road maintenance is ongoing, ditch cleaning, minor road improvements/reconditioning (0.1 miles reconstruct, 3.2 miles recondition). Log haul could increase sediment delivery at 2 crossings in the short-term. Dust abatement would reduce the risk and quantity. Gravel placement would reduce sediment delivery in the long-term.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Gravel placement would slow overland flow and reduce runoff
Road Decommissioning	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Potential for increased sediment delivery at 9 stream crossings during 4.4 miles of road decom activities until road is revegetated (2 years).
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Compacted soils allow for increased overland flow. Once roads are decompacted and recontoured infiltration would increase and concentrated overland flow would diminish. Nine culverts would be removed.
	Solar heating	Riparian shade			+L	Vegetative recovery and tree growth in long-term
Road Storage	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Potential for increased sediment delivery at 6 stream crossings during removal until crossings are revegetated (2 years). Total of 3.6 miles stored.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Road placed in hydrologically stable condition. Six culverts removed. Infiltration would increase and concentrated overland flow would diminish. Stream channels placed in natural condition
		Total	-9	-3	+7	Post-fire sedimentation effects from surface erosion not likely to be detectable due to thick understory vegetation regrowth. Proposed harvest activities under Alternative 2 would be minimal given harvest methods and project design criteria. Proposed road improvements and decommissioning efforts would be long-term beneficial watershed improvements.

Goddard Creek Upward Trend Summary: Cobble embeddedness in Goddard Creek exceeds desired conditions and appears to be somewhat static (see Fisheries Report, Table 2). Wolman pebble count data, however, shows a definite decline in fine sediment. Levels were 10% in 2016 compared to 18% in 2015 and 27% in 2013 (see Fisheries Report, Table 3). The current upward trend for aquatic habitat conditions and fish habitat capacity is expected to continue in the Goddard Creek because of road improvements and decommissioning associated with the project, the relatively intact RHCAs, and the implementation of design features and BMPs which have been shown to be 95-100% effective (USDA Forest

Service, 2009). Proposed actions place the prescription watershed in improved conditions over the existing condition, especially with the removal of 15 stream crossings.

Lower O'Hara Creek Upward Trend Analysis

Past activities contributing towards upward trend in Lower O'Hara Creek include:

- Replacement of 4 culverts in 2015 on roads needed for future management. Replacements reduce the risk of culvert failure and subsequent sediment delivery by increasing the size of the pipes.
- A total of 8.1 miles of road are open year round to motorized traffic. They are graveled, have 20 stream crossing and also have cross drain structures in place to limit sediment delivery to streams. The remaining 11 miles of road (8.8 miles graveled, 2.2 native surfaced) are closed year round which minimizes potential sediment delivery from motorized use.
- Streamside buffers were retained along perennial streams adjacent to harvest units since 1992 (no harvest prior to then). Buffers provide for streambank stability, shade, and current and future woody material needed for aquatic habitat development.
- Annual road maintenance on Road 651 to maintain adequate drainage and minimize erosion and subsequent delivery to O'Hara Creek.

Table 55. Johnson Bar proposed action potential effects in Lower O'Hara Creek

Action	Process Affected	Characteristic Indicator	Alt 1 Existing Condition	Alt 2 Short-term	Alt 2 Long-term	Explanations
Vegetation Treatments	Surface erosion	Pulse and Chronic Sediment				Low to moderate burn severity ~10% of the watershed including Wash Fire. Alt 2 salvages 274 acres (3% of watershed). Estimated increase in sediment yield from project is 12%. Cumulative sediment yield is 15%. Forest Plan allowed is 30%. Understory growth throughout and PACFISH buffer and down wood retention in units is expected to minimize surface erosion based on 2016 helicopter flight and field reviews.
	Mass failure risk	Pulse sediment				No vegetation treatment, temporary roads or swing trail construction on landslide prone or high mass wasting areas.
	Infiltration, runoff, peaks	Hydrologic process		-L		Compacted soils minimized by skyline (59%) and helicopter (38%) harvest methods. Peak flows mitigated by post-harvest treatments and road decommissioning efforts.
	Solar heating	Riparian shade				<5% of RHCAs burned at low fire severity including Wash Fire. No vegetation treatment would occur in RHCAs.
Temporary Road Construction	Surface erosion	Pulse and Chronic Sediment				Approximately 0.5 miles of temporary road and 0.9 miles of swing trails (6 acres total), none within RHCAs or stream crossings. No RHCA disturbance and no delivery to streams expected based on location and monitoring in 2014. Roads/trails would be obliterated after harvest.

Action	Process Affected	Characteristic Indicator	Alt 1 Existing Condition	Alt 2 Short-term	Alt 2 Long-term	Explanations
	Mass failure risk	Pulse sediment				No temp road construction would occur on landslide prone or high mass wasting areas.
	Infiltration, runoff, peaks	Hydrologic process		-L		Compacted soils could limit infiltration and concentrate flow in the short-term. Roads/trails would be decompacted, recontoured, and revegetated.
	Riparian shade	Riparian condition				No temp road or swing trail construction in RHCAs
Road Improvement	Surface erosion	Pulse and Chronic Sediment	-L	-M	+M	Road maintenance is ongoing, ditch cleaning, minor road improvements/reconditioning (13.4 miles recondition). Log haul could increase sediment delivery at 30 crossings in the short-term. Dust abatement would reduce the risk and quantity. Gravel placement would reduce sediment delivery in the long-term.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Gravel placement would slow overland flow and reduce runoff
Road Decommissioning	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Potential for increased sediment delivery at 11 stream crossings during 5.7 miles of road decom activities until road is revegetated (2 years).
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Compacted soils allow for increased overland flow. Once roads are decompacted and recontoured infiltration would increase and concentrated overland flow would diminish. Eleven culverts would be removed.
	Solar heating	Riparian shade			+L	Vegetative recovery and tree growth in long-term
		Total	-4	-3	+6	Post-fire sedimentation effects from surface erosion not likely to be detectable due to thick understory vegetation regrowth. Proposed harvest activities under Alternative 2 would be minimal given harvest methods and project design criteria. Proposed road improvements and decommissioning efforts would be long-term beneficial watershed improvements.

Lower O'Hara Creek Upward Trend Summary: Cobble embeddedness in Lower O'Hara Creek exceeds desired conditions and appears to be highly variable (see Fisheries Report, Table 2). Wolman pebble count data, however, shows a definite decline in fine sediment. Levels were 7% in 2016 compared to 15% in 2014 and 17% in 2012 (see Fisheries Report, Table 3). The current upward trend for aquatic habitat conditions and fish habitat capacity is expected to continue in Lower O'Hara Creek because of road improvements and decommissioning associated with the project, the relatively intact RHCAs, and the implementation of design features and BMPs which have been shown to be 95-100% effective (USDA Forest Service, 2009). Slightly less improvements are expected as a result of log hauling activities over stream crossings, however effects are expected to be short-term (2 years or the life of the contract) and minimized by dust abatement and road maintenance. Proposed actions place the prescription watershed in improved conditions over the existing condition, especially with the removal of 11 stream crossings.

Swiftwater Creek Upward Trend Analysis

Past activities contributing towards upward trend in Swiftwater Creek include:

- Decommissioning of 2.4 miles of road not needed for future management. A total of 20 stream crossings were removed which eliminates a potential sediment delivery point, eliminates potential fill failure risk and returns the stream channel to natural conditions
- A total of 7.9 miles of road are open year round to motorized traffic. They are graveled and cross drain structures are in place to limit sediment delivery to streams. The remaining 8.1 miles of road (3.5 miles graveled, 4.6 native surfaced) are closed year round which minimizes potential sediment delivery from motorized use.
- Streamside buffers were retained along perennial streams adjacent to harvest units since the 1960s. Buffers provide for streambank stability, shade, and current and future woody material needed for aquatic habitat development.
- Annual road maintenance on Road 651 to maintain adequate drainage and minimize erosion and subsequent delivery to Swiftwater Creek.

Table 56. Johnson Bar proposed action potential effects in Swiftwater Creek

Action	Process Affected	Characteristic Indicator	Alt 1 Existing Condition	Alt 2 Short-term	Alt 2 Long-term	Explanations
Vegetation Treatments	Surface erosion	Pulse and Chronic Sediment	-L	-L		Moderate to high burn severity ~50% of the watershed. Alt 2 salvages 292 acres (7% of watershed). Estimated increase in sediment yield from project is 27%. Cumulative sediment yield is 32% (includes private and state harvest in 2014/2015). Forest Plan allowed is 45%. Understory growth and PACFISH buffer and down wood retention in units is expected to minimize surface erosion based on 2016 field reviews of stream after IDL and private harvest activities.
	Mass failure risk	Pulse sediment	-L			No vegetation treatment, temporary roads or swing trail construction on landslide prone or high mass wasting areas. IDL and private harvest not on landslide prone.
	Infiltration, runoff, peaks	Hydrologic process	-M	-L		Only short-term increases in post-fire runoff is expected given the percentage of moderate to high burn severity throughout much of the drainage. Compacted soils minimized by skyline (47%) and helicopter (40%) harvest methods.
	Solar heating	Riparian shade	-L			About 25% of RHCAs burned at low to moderate burn severity and is not expected to increase stream temperatures due to thick riparian vegetation. No vegetation treatment would occur in RHCAs. Buffers on state and private are expected to provide adequate shade.

Action	Process Affected	Characteristic Indicator	Alt 1 Existing Condition	Alt 2 Short-term	Alt 2 Long-term	Explanations
Temporary Road Construction	Surface erosion	Pulse and Chronic Sediment				Approximately 0.2 miles of temporary road and 1.3 miles of swing trails (6 acres total), none within RHCAs or stream crossings. No RHCA disturbance and no delivery to streams expected based on location and monitoring in 2014. Roads would be obliterated after harvest.
	Mass failure risk	Pulse sediment				No temp road construction would occur on landslide prone or high mass wasting areas.
	Infiltration, runoff, peaks	Hydrologic process		-L		Compacted soils could limit infiltration and concentrate flow in the short-term. Roads would be decompacted, recontoured, and revegetated.
	Solar heating	Riparian shade				No temp road construction in RHCAs
Road Improvement	Surface erosion	Pulse and Chronic Sediment	-L	+M	+M	Road maintenance is ongoing, ditch cleaning, minor road improvements/reconditioning (1.3 miles reconstruct, 5.7 miles recondition). One culvert replacement on Rd 470. Log haul could increase sediment delivery at 5 crossings in the short-term. Dust abatement would reduce the risk and quantity. Gravel placement would reduce sediment delivery in the long-term.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Gravel placement would slow overland flow and reduce runoff
Road Decommissioning	Surface erosion	Pulse and Chronic Sediment	-L	-L	+L	Potential for increased sediment delivery at 13 stream crossings during road decom activities and until road is revegetated (2 years). Total of 3.5 miles decom.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Compacted soils allow for increased overland flow. Once roads are decompacted and recontoured infiltration would increase and concentrated overland flow would diminish. Thirteen culverts would be removed.
	Solar heating	Riparian shade			+L	Vegetative recovery and tree growth in long-term
Road Storage	Surface erosion	Pulse and Chronic Sediment				On ridge-top with no delivery potential to stream. Total 0.3miles stored.
	Infiltration, runoff, peaks	Hydrologic process	-L	+L	+L	Road placed in hydrologically stable condition. No culverts involved.
Stream Crossing Improvement	Surface erosion	Pulse and Chronic Sediment		-L	+L	One crossing replaced under Road 470. Short-term, localized sediment could be delivered during implementation and until road fill slopes are stabilized and revegetated. Long-term culverts would allow for 100 year flows. Very small streams involved (<12” wide).
	Mass failure risk	Pulse sediment		+L	+L	
	Infiltration, runoff, peaks	Hydrologic process				

Action	Process Affected	Characteristic Indicator	Alt 1 Existing Condition	Alt 2 Short-term	Alt 2 Long-term	Explanations
		Total	-10	1	+9	Post-fire sedimentation effects from surface erosion not likely to be detectable due to thick understory vegetation regrowth. Proposed harvest activities under Alternative 2 would be minimal given harvest methods and project design criteria. Proposed road improvements and decommissioning efforts would be long-term beneficial watershed improvements.

Swiftwater Creek Upward Trend Summary: Cobble embeddedness in Swiftwater Creek exceeds desired conditions; however a slight decrease was observed between 2013 and 2016 (see Fisheries Report, Table 2). In addition Wolman pebble count data which shows a decline in fine sediment. Levels were 7% in 2016 compared to 17% in 2015 and 13% in 2013 (see Fisheries Report, Table 3). The current upward trend for aquatic habitat conditions and fish habitat capacity is expected to continue in the Swiftwater Creek because of road improvements and decommissioning associated with the project, the relatively intact RHCAs, and the implementation of design features and BMPs which have been shown to be 95-100% effective (USDA Forest Service, 2009). Proposed actions place the prescription watershed in improved conditions over the existing condition, especially with the removal of 13 stream crossings.

A positive upward trend was determined for each of the prescription watersheds that did not meet their Forest Plan, Appendix A fish/water quality objectives based on measured cobble embeddedness. The upward trends are primarily a result of riparian areas that are mostly intact with minimal effects from the fire or land management activities. Also, the majority of roads are graveled and positioned to have minimal effects to streams. The Forest Plan Appendix A Implementation Guide (Conroy and Thompson 2011) states "It was assumed in the Forest Plan that implementation of instream restoration and other watershed restoration activities would result in an upward trend in carrying capacity. Where these activities have been implemented, it could be stated that an upward trend in habitat conditions has been accomplished." Watershed restoration activities in the form of road improvement, culvert replacement, and road decommissioning have been, and continue to be, implemented in the project area. Road access management has also restricted motorized access to only 38% of project area roads. These combined activities have contributed to the upward trend in fish habitat carrying capacity based on the Appendix A guidance document.

Short-term effects to modeled sediment yield are expected with the implementation of the Johnson Bar Fire Salvage Project; however, they do not exceed Appendix A sediment yield guidelines. Short-term (<2 years) negative effects with long-term beneficial effects to sediment yield would be expected as a result of the road improvement and decommissioning activities. The proposed actions are an improvement over the No Action which does not address road-related sediment issues beyond what projects have already been completed. Modeling in FISHSED shows increases in cobble embeddedness of 0-3% over post-fire conditions. This is below the 10% threshold where changes might occur based on the model documentation (Stowell, 1983). Upward trend of aquatic and watershed conditions, particularly related to sediment, would therefore be realized over the long-term (>5 years), primarily as a result of road related projects. In addition, BMPs and project specific design criteria would be implemented in order to minimize sediment additions to streams.

In summary, the Johnson Bar Fire Salvage Project would have minimal short term negative effects associated with modeled water yield and sediment increases but would have a long term positive effect associated with road improvements. The combined road-related projects are expected to maintain an upward trend through reduced sediment delivery and runoff from roads to streams and aquatic habitats throughout the watershed. Reduced chronic sediment delivery is expected to allow for improved fish habitat carrying capacity continued upward trend over time.

Appendix G – Wildlife Eliminated from Detailed Analysis

Table 57 lists Nez Perce National Forest TES, sensitive species and management indicator species that may occur in the project area boundary. Additional columns display if suitable habitat is present and/or would be affected in the project area for the associated species. Another column displays if the animal is known to be in the project area, and the determination column shows if the proposed project actions are likely to affect the species or habitat.

Species highlighted in gray are analyzed in detail in the wildlife section of Chapter 3 in the EIS. Species non-highlighted were dropped from detailed study if: 1) habitat (and therefore the species) is not present; 2) habitat is protected by regulations, policies, laws, or project design criteria; or 3) no activities are proposed in suitable habitats such that there would be no effect; effects would be improbable; or the effects would be immeasurable.

Table 57. Threatened (T), sensitive (S), and management indicator species (MIS) that the Nez Perce portion of the National Forest must evaluate for each project. A yes (Y) or no (N) indicates how this project would affect each species.

Species Name	Status	Habitat Present	Habitat Affected	Known Occurance	Determination
Canada Lynx (*Lynx canadensis*)	T	N	N	N[a]	NE
American Peregrine Falcon (*Falco peregrinus anatum*)	S, MIS	N	N	N	NI
Bald Eagle (*Haliaeetus leucocephalus*)	S, MIS	Y	N	Y	MIIH
Black-backed woodpecker (*Picoides arcticus*)	S	Y	Y	Y	MIIH
Black Swift (*Cypseloides niger*)	S	N	N	N	NI
Common Loon (*Gavia immer*)	S	N	N	N	NI
Coeur d'Alene salamander (*Plethodon idahoensis*)	S	Y	N	Y	NI
Flammulated Owl (*Otus flammeolus*)	S	Y	Y	Y	MIIH
Fisher (*Martes pennant*)	S, MIS	Y	Y	Y	MIIH
Fringed Myotis (*Myotis thysanodes*)	S	Y	Y	N	MIIH
Gray Wolf (*Canis lupus*)	S, MIS	Y	Y	Y	MIIH
Harlequin Duck (*Histrionicus histrionicus*)	S	N	N	N	NI

Species Name	Status	Habitat Present	Habitat Affected	Known Occurance	Determination
Long-billed curlew (*Numenius americanus*)	S	N	N	N	NI
Long-eared myotis (*Myotis evotis*)	S	Y	Y	Y	MIIH
Long-legged myotis (*Myotis volans*)	S	Y	Y	Y	MIIH
Mountain Quail (*Oreortyx pictus*)	S	N	N	N	NI
North American Wolverine (*Gulo gulo luscus*)	S	Y	N	N	NI
Pygmy Nuthatch (*Sitta pygmaea*)	S	Y	N	N	NI
Ringneck snake (*Diadophis punctatus*)	S	Y	N	N	NI
Townsend's big-eared bat (*Corynorhinus townsendii*)	S	N	N	N	NI
Western Toad (*Bufo boreas*)	S	Y	N	N	NI
White-headed woodpecker (*Picoides albolarvatus*)	S	N	N	N	NI
American Marten (*Martes Americana*)	MIS	Y	Y	N	
Bighorn Sheep (*Ovis canandensis*)	S, MIS	N	N	N	NI
Grizzly Bear (*Ursus arctos horribillis)*	MIS	Y	N	Unknown	currently unoccupied status
Northern Goshawk (*Accipiter gentilis*)	MIS	Y	Y	Y	
Pileated Woodpecker (*Dryocopus pileatus*)	MIS	Y	Y	Y	
Rocky Mountain Elk (*Cervas elaphus*)	MIS	Y	N	Y	
Shiras Moose (*Alces Alces*)	MIS	Y	Y	N	

[a] Not seen since 1999. Determinations: NE= no effects; NI= no effects; MIIH= may affect individuals or their habitats, but not likely to result in a trend to federal listing or a reduced viability for the population or species.

Species Dropped from Detailed Analysis

Not all management indicator species (MIS) and Forest sensitive species or their habitats occur in the analysis area. Species unlikely to be present due to insufficient habitat and/or species unaffected by proposed activities include: Canada lynx, American peregrine falcon, bighorn sheep, black swift, common loon, Coeur d' Alene salamander, grizzly bear, harlequin duck, long-billed curlew, mountain quail, north American wolverine, ring-neck snake, Townsend's big-eared bat and yellow-billed cuckoo. These species will not be considered in detail in this assessment.

Canada Lynx

The project area is not in a lynx analysis area (LAU). No lynx observations or signs have been detected in the project area. The proposed activities for this project would have ***no impact*** on the Canada lynx or its habitat. The lynx was dropped from detailed analysis.

American Peregrine Falcon

This species is a Nez Perce National Forest sensitive species and an Idaho species of greatest conservation need (IDFG 2005). Peregrine falcons nests on ledges on steep cliff faces. No cliff habitat has been identified in the PA. No peregrine falcons have been detected in the project area. The proposed activities would have ***no impact*** on this species and it was dropped from detailed study.

Bighorn Sheep

This species is a Nez Perce National Forest sensitive species and management indicator species and an Idaho species of greatest conservation need (IDFG 2005). There is no suitable habitat or detections of the sheep in the analysis area, therefore the proposed activities would have ***no impact*** on this species and it was dropped from detailed study.

Black Swift

This species is a Nez Perce National Forest sensitive species and an Idaho species of greatest conservation need (IDFG 2005). The black swift is a neotropical migratory bird that nests in moist cliff environments, preferring high elevation mountains. Nests are built on cliff ledges, near or behind waterfalls or in shallow caves. Riparian habitats would be protected by implementing Forest Plan Amendment 20 (PACFISH) and no suitable habitat is known to occur in the project area. Researchers found that most of Idaho's Black Swift observations occurred in the northern panhandle, north of the Lochsa River. They concluded that "South of the Lochsa River the more highly metamorphosed Precambrian Belt rocks lose some of their layering as they change into schist, probably reducing the availability of nesting ledges like those at Shadow and Fern falls. Our observations of nest-site habitat at Shadow and Fern falls and the prevalence of summer sight records in [northern Idaho] suggest that any northern Idaho waterfall on sedimentary rock may meet the requirements of nesting Black Swifts and should be investigated. Additional field work should enhance our knowledge of the distribution of Black Swifts in Idaho." *(*Levad 2007). The author used quotes from Dumroese, R. K., M. R. Mousseaux, S. H. Sturts, D. A. Stephens, and P. A. Hollick. 2001. Idaho Black Swifts nesting habitat and spacial analysis of records. *Western Birds* 32:218-227.

The proposed activities would have ***no impact*** on this species and it was dropped from detailed study.

Coeur d' Alene salamander

The salamander has been observed (1998, 2002) in tributaries to the Selway River. Potential habitat features are present in the analysis area, however, no activities are proposed in the streams or adjacent riparian habitats. The action alternatives would affect 15-16 acres of the upper portions of RHCAs. The proposed road decommissioning activities would reduce potential future sedimentation into the affected tributaries that empty into the Selway River. The project would have ***no impact*** on this species and it was dropped from detailed analysis.

Common Loon

This species is a Nez Perce National Forest sensitive species. It is found in rivers, pond and lake environments. No ponds or lakes are present in the project area. No harvest activities would occur adjacent to the Selway or Middle Fork Clearwater rivers. The proposed activities would have ***no impact*** on this species and it was dropped from detailed study.

Grizzly bear

Despite numerous studies and many reported bear observations, there have been no verifiable sightings of grizzly bears in the last 60 years until an adult male grizzly bear was mistakenly killed by a black bear hunter in September 2007 in the northern mountains of the Bitterroot Ecosystem.

In November 2000, the U.S. Fish and Wildlife Service (FWS) published a Record of Decision (ROD) for a Final Environmental Impact Statement to reintroduce bears in the Bitterroot Ecosystem. The preferred alternative selected in the ROD called for establishment of a nonessential experimental population of grizzlies in the Bitterroot ecosystem under section 10(j) of the Endangered Species Act. The decision was to reintroduce grizzly bears only into the Selway-Bitterroot Wilderness Area unless it was later determined that reintroduction in the Frank Church-River of No Return Wilderness also was appropriate. The State of Idaho sued to block the plan.

The Service is now reevaluating this Record of Decision and is proposing a "No Action" alternative. The U.S. Fish and Wildlife Service proposes to concentrate recovery efforts and resources on existing grizzly bear populations in the lower 48 states and to withdraw its plan to reintroduce grizzly bears into the Bitterroot ecosystem of Idaho and Montana. Public comment on this proposal was received but there has not been a final decision. If the No Action alternative is selected, grizzly bears would not be reintroduced into the Bitterroot ecosystem.

The analysis area falls within the Bitterroot Grizzly Bear Experimental Population Area but outside the Recovery Area. The Bitterroot Grizzly Bear Recovery Area consists of the Selway-Bitterroot Wilderness and the Frank Church-River of No Return Wilderness. The Recovery Area is located within the Experimental Population Area, and is the area where grizzly bear recovery would be emphasized.

Because the FWS is re-considering grizzly reintroduction into the Bitterroot ecosystem, pending State of Idaho litigation if implementation of a reintroduction program is proposed, and since there has been only one verifiable grizzly sighting in the Clearwater basin in the last 60 years, the grizzly will not be further considered in detail in this analysis.

Harlequin duck

Harlequin summer habitat is not expected to be affected by the salvage project. Records of the bird in the river portions along the project area (1 detection in 1995) indicate potential presence. Potential breeding habitat is further upstream on the Selway and Lochsa Rivers. Project activities would not occur in the duck's habitat, and foraging opportunities would remain available. The project would have ***no impact*** on this species and no further analysis is required.

Long-billed Curlew

Long-billed curlews nest in open short-grass or mixed-prairie habitat with level or slightly rolling topography and in general avoid areas of trees, high-density shrubs, and tall, dense grasses. The non-forested areas in the analysis are limited and do not provide suitable habitat for this species. This project would have ***no impact*** on this species; therefore it was dropped from detailed study.

Mountain Quail

Recent surveys in Idaho indicated mountain quail are commonly found only in the lower Salmon River drainage, particularly the Little Salmon River Canyon of Idaho County (Brennan 1989; Robertson 1989, 1990; Heekin et al. 1995). There is no favorable habitat in the PA for the mountain quail. Therefore, ***no impact*** to the mountain quail or its habitat.

North American Wolverine

Year-round habitat is at high elevation, in or above tree line, basins and rock chutes that have sources of food for the wolverine. Deep and persistent snow habitats with reliable snow cover lasting through mid-April to May is the best predictor of wolverine occurrence (USFWS 2013, 2014). The PA lacks such habitat. No modelled habitat was shown by GIS models and no occurrence of the wolverine has been recorded in the project area. This project would have ***no impact*** on the wolverine.

Pygmy Nuthatch

Approximately 21 acres of potential ponderosa pine habitat was shown to be in the project area. This is a very small amount of potential habita that would not be connected to other habitat needed to support a small population of birds. Project activities would not affect the potential habitat, the bird has not been seen in the area; thefore, there would be ***no impact*** to the pygmy nuthatch.

Ring-neck Snake

In west–central Idaho, ring-necked snakes are typically found adjacent to perennial rivers or streams in grassland or forested habitats (IDFG 2005). It is known to use forested and brushy areas or open hillsides with rocks or other debris to hide in, and may even use moist microhabitats (Storm and Leonard 1995). The snake is nocturnal and hides underground or under surface cover during the day.

Modelled habitat (VRU3) showed about 192 acres on the west side of the Selway River, near the confluence with the Lochsa River. No detections of the snake have occurred in this area. None of the action alternatives in the proposed project would affect any habitat for the snake. This salvage project would cause ***no impact*** to the ring-neck snake.

Townsend's Big-eared Bat

Townsend observations have been confirmed on both the Clearwater and Moose Creek Ranger Districts. Romin and Bosworth (2010) found this bat just northeast of the analysis area on the Moose Creek Ranger District along the Selway River in the vicinity of Goddard Creek.

Perkins (1992) surveyed some of the most suitable hibernacula and maternity/nursery roost sites on the Nez Perce Forest during summer and winter without finding any recent evidence or presence of Townsend's big-eared bat on the Forest. He suggested that their occurrence on the forest is peripheral and does not involve reproductive activities. The probable occurrence of this bat outside the Salmon and Snake River riparian areas is extremely low and initial population indicators suggest less than 10 on the Forest (Perkins).

Because the PA does not have cave habitat, it is unlikely that Townsend's big-eared bats use snags as day or night roosting habitat or forage in the area. For this reason, they were dropped from detailed analysis and the project would have ***no impact*** on this bat.

Western Toad

The toad is found in a variety of habitats but lives in or near water. Western toads eat a variety of insects and have been found in burned over areas (Guscio et al. 2007). GIS modelling calculated about 4,620 acres of potential toad habitat- all in riparian areas. No harvest units from any of the action alternatives would affect modelled toad habitat. Wildlife occurrence databases revealed no records of western toads in the Project area.

The effects of the Johnson Bar fire would likely create a pulse of insect activity in the post-burned locations that would be favorable for toads to forage on. For this reason, the western toad was dropped from detailed analysis and the project would have ***no impact*** on this amphibian.

White-headed Woodpecker

In Idaho all observations of the woodpeckers were in mature and old stands of mixed ponderosa pine and Douglas-fir with open canopies and relatively low density of trees (Frederick and Moore 1991). Bull et al. (1986) noted that only ponderosa pine and ponderosa pine forest types were used as foraging areas by white-headed woodpeckers. White-headed woodpeckers forage on insects such as ants, wood boring beetles, spiders, and fly larvae gleaned from tree bark, branches, and foliage from May to September (Blair and Servheen 1995). Potential white-headed woodpecker habitat was analyzed from GIS models. Only 15 acres were detected, and of this, proposed salvage harvest units would affect ½ acre in all action alternatives. With minimal acres present and the potential modification of 0.5 acres, the project would have an immeasurable affect to the woodpecker. No observations of the woodpecker haveoccurred in the PA. The proposed project activities would have ***no impact*** to the white-headed woodpecker.

Appendix H – Photos

Photos below show natural and manmade openings within the river corridors. The objective is to show how the natural and man made openings look similar to the

Figure 50. Meadow Creek natural opening caused by wildfire.

Figure 51. Natural opening along river

Figure 52. Lower right is manmade opening on private land cut in 2016 after the Johnson Bar fire. The upper left shows openings forming two years after the same fire as trees start to fall down

Figure 53. Natural openings at the Selway River confluence two years after the Johnson Bar fire

Figure 54. Manmade variable retention clearcut with reserves. One to five years after harvest

Appendix I – Responses to Opposing Science

Much of the literature cited by commenters of the Johnson Bar Fire Salvage Project DEIS and FEIS addresses a variety of resources, topics, or issues. The Johnson Bar Fire Salvage IDT considered the general principles and recommendation made in the various literature cited. Some articles and reports were not applicable to the proposed activities. Other articles and reports provided general or background information and were consistent with the project analysis. Other articles provided opposing views to the proposed project and are discussed below. A review of all literature cited by commenters is contained in the project record.

Beschta et al. 1995 Post-fire Principles and Recommendations
In March, 1995, Dr. Robert Beschta, Oregon State University, and other research scientists produced a commentary entitled: "Wildfire and Salvage Logging, Recommendations for Ecologically Sound Post-Fire Salvage Logging and Other Post-Fire Treatments on Federal Lands in the West." This document was prefaced with a discussion of the interrelationships between the natural disturbance cycle and the impacts of past land management, and the need to examine and "focus on the pattern and consequences of current and proposed human manipulation and disturbances of all types at the landscape level."

Since the 'Beschta Report', numerous research studies have been published related to the impacts of salvage harvest on ecosystem processes. For soil and water resources, critical concerns are potential increases to erosion and compaction resulting in long-term diminishment of soil productivity and degradation of water quality. Numerous studies show that the practice of post-fire salvage logging has the potential to increase erosion and instream sedimentation significantly more than burned areas where no harvest occurs (Slesak et al 2015; Reynolds et al 2011; McIver and McNeil 2006; Silins et al 2000). Many of these studies show that erosion and sedimentation increase proportionally to burn severity and it is the roads and skid trails contributing the majority of sediment, not the harvested slopes themselves (Smith et al., 2011; McIver and McNeil, 2006; Stabenow et al., 2006). Along with a greater understanding of the potential effects emerge recommendations for harvest methods that this research shows will mitigate or avoid impacts to soil and water resources. Specifically, the Beschta Report (as well as numerous other recent peer reviewed studies) recommends avoiding ground-based salvage logging in the following locations:

- in severely burned areas where loss of duff/litter layer has occurred
- on erosive sites
- on fragile soils
- in roadless areas
- in riparian areas
- on steep slopes or any site where accelerated erosion is possible.
- Avoid road building if possible and obliterate unneeded roads at conclusion of work

The IDT reviewed the Beschta et al. and related reports and believe that the Johnson Bar project's proposed actions follow many of the Beschta et al recommendations, such as protecting soil, avoiding severe burn and sensitive areas, avoiding riparian area and roadless areas, using local seed sources for reforestation, and addressing sediment sources through road work, which are incorporated into the design criteria. Harvest methods (92-99% of the ground would be skyline cable or helicopter logged), Design Features, BMPs, and erosion controls were selected based on soil sensitivity as a result of the fire and in order to minimize effects. Design Features, including PACFISH buffers, and BMPs would be incorporated into the selected actions for these projects to protect resources and limit adverse effects. Specifically, the project adopted the following Design Criteria where peer reviewed literature validates effectiveness for avoiding long-term impacts to soil and water.

- All areas identified as having risk factors for landslides are removed from the project by applying an RHCA buffer around them
- No harvest activities will occur in riparian areas
- Limited temporary road construction will occur to support the project, all roads, skid trails, and swingline trails will be fully obliterated at the end of the project. Temporary roads are located on ridgetops with shallow slopes and away from water crossings. In addition, old roads have been scheduled for decommissiong.
- Limit tractor logging to gentler slopes (tractor skidding is prospoed on only 1-8% of the treatment acres). The primary yarding system is skyline cable and helicopter.

And further, the 2016 field reviews showed that even in areas of high burn severity, soil cover through litter fall has recovered since the 2015 event, providing effective ground cover in the majority of the burned areas. Also, to protect soils, coarse woody debris and activity generated slash would be left on site as natural mulch in all high burn severity areas. Research shows that the use of slash as a natural, post-harvest cover reduces surface erosion by up to 90% (Robichaud et al 2011, Wagenbrenner et al 2015).

Beschta et al recommends relying on natural regeneration following fires, but some areas burned during the Woodrat fire will not regenerate quickly, due to a lack of seed source and the harsher, dryer aspect. The impact of this is that the site will be delayed from long term recovery for soil stability and wildlife habitat. Tree planting would help the landscape recover quicker by 5-10 years, because the area wouldn't have to wait for a viable seed source to form in order to naturally regenerate. Removal of most of the dead trees (17-33 tons/acre of standing snags would be left in units) would facilitate the reforestation, because the planted trees would grow better in a microclimate consisting of less than 30% shade, instead of the existing 60% plus of shade from the snags boles. Without reforestation with early seral species, the forest would not be able to adapt to the agents of change like root rot, wildfire, drought and climate change.

Donato et al. 2006

Donato et al. 2006 published a report in *Sciencexpress* and in the journal *Science* regarding post-fire logging hindering regeneration and increasing fire risk in the Biscuit Fire project area. Baird 2006 completed an analysis of the Donato et al. methodology and determined that there may be serious flaws in regards to the study and its design, including statistical analysis of the data presented. The IDT reviewed the report and determined the report provided background information in regards to salvage harvesting activities; however, the report is not applicable in many ways. The proposed project includes both artificial and natural regeneration. Also, the Biscuit salvage activities occurred several years after the actual fire; whereas, the Johnson Bar Fire Salvage salvage activities are expected to occur following a shorter time separation. The proposed project salvage activities are expected to help manage fuels over the short- and long-term; thereby, reducing the potential for reburn and fire intensity.

Johnson et al. 2007

One objector stated that the analysis did not consider Johnson, et al. 2007 in regards to the "reburn theory". The objector states that the study does not support the reburn theory. The study, *Effects of Salvage Logging and Pile and Burn on Fuel Loading, Fire Behavior, and Emissions* was compiled from data gathered from a windthrow event in central Oregon. The authors hypothesized that fuels would increase after logging and decrease after treatment. From site-specific data the authors concluded the treatment "…clearly reduced fuel loadings, fuel-bed depth, and simulated smoke emissions…" but "…did not produce unequivocal evidence…" of a significant reduction in fire behavior (p. 767).

The study does note that the fuel levels were low to begin with and "…it is possible…" that greater effects would occur with a higher fuel loading (p. 767).

From this, the authors compare their results with other researcher's work based on post-wildfire salvage and surmise that the fuel loadings would be greater. But the study also notes that "…fire managers have less concern about coarse woody fuel because these fuels do not influence fire rate-of-spread and flame length" (P.764).

Furthermore, the study states that there is usually an immediate reduction in fuels following a wildfire, but over time fuel loadings may increase above pre-fire loadings as fire-killed snags fall (P. 758). This increase in fuel loadings may increase soil heating (P. 764).

Using site specific data from the Johnson Bar Fire and one of the same models used by the authors, the analysis reaches the same conclusion, namely that coarse woody fuels will increase over time and other resource areas may be affected in untreated areas, while treated areas will have reduced fuel loadings and smoke emissions. There is no reason to believe that the risk of ignition (predominantly lightning) will decrease, and may actually increase.

Also, this study was conducted on tractor logging units on slopes less than 18 degrees, which is approximately 34% slope. At around 35% slope or greater the rate of spread increases dramatically (Butler, 2007). The majority of the Johnson Bar Fire Salvage project area is greater than 35% slope, so greater fire behavior should be expected in untreated areas as the authors mentioned (see above), with a corresponding decrease in treated areas.

As the study does not actually draw a conclusion from data based on wildfires, and instead supports the analysis, Johnson et al. 2007 was not considered.

Karr et al. 2004

Karr et al. 2004 published a peer-reviewed report in the journal *BioScience* regarding the effects of salvage logging aquatic ecosystems and presented recommendations very similar to the ones proposed by Beschta et al. 1995 and 2004. The IDT reviewed the report and determined that the completed analysis utilized the most recent literature available and sources within the range of cited scientific literature. Effects to aquatic species were analyzed in the EIS and design criteria and BMPs would be incorporated into the proposed project in order to minimize adverse effects.

Lindenmayer et al. 2004

Lindenmayer et al. 2004 published an opinion or editorial piece in the journal *Science* regarding salvage harvesting. The IDT reviewed the report and determined that the project included an alternative that incorporated the reports findings, namely Alternative 1 – No Action. The proposed project action alternatives also incorporate design criteria and BMPs in order to minimize adverse effects to resources.

Noss et al. 2006

Noss et al. published an opinion or editorial piece in *Society for Conservation Biology* that reviewed ecological science pertaining to fire management fires on forests in the western United States. The article did not incorporate literature citations, making it difficult to determine if the analysis is based upon scientific fact or to determine the veracity of the findings. The IDT reviewed the report and determined that the proposed project addresses the report's findings through the various alternatives, including the No Action alternative, or components of the various alternatives, including incorporating natural regeneration when applicable.

Open Letter to Members of Congress from 250 Scientists Concerned about Post-fire Logging

Some objectors referenced an opinion letter to members of Congress from 250 scientists, who were concerned about post-disturbance legislation addressed in HR 1526 and the over-riding of environmental laws proposed in HR 3188. While the Johnson Bar Fire Salvage Project is a post-fire fire salvage project, it does not propose any changes to existing legislation. The letter also discusses the ecological importance of post-fire landscapes and the amount of studies documenting cumulative effects of post-fire logging. Both the draft and final Environmental Impact Statements for the Johnson Bar Fire Salvage Project analyzed direct, indirect, and cumulative effects as a result of the four alternatives.